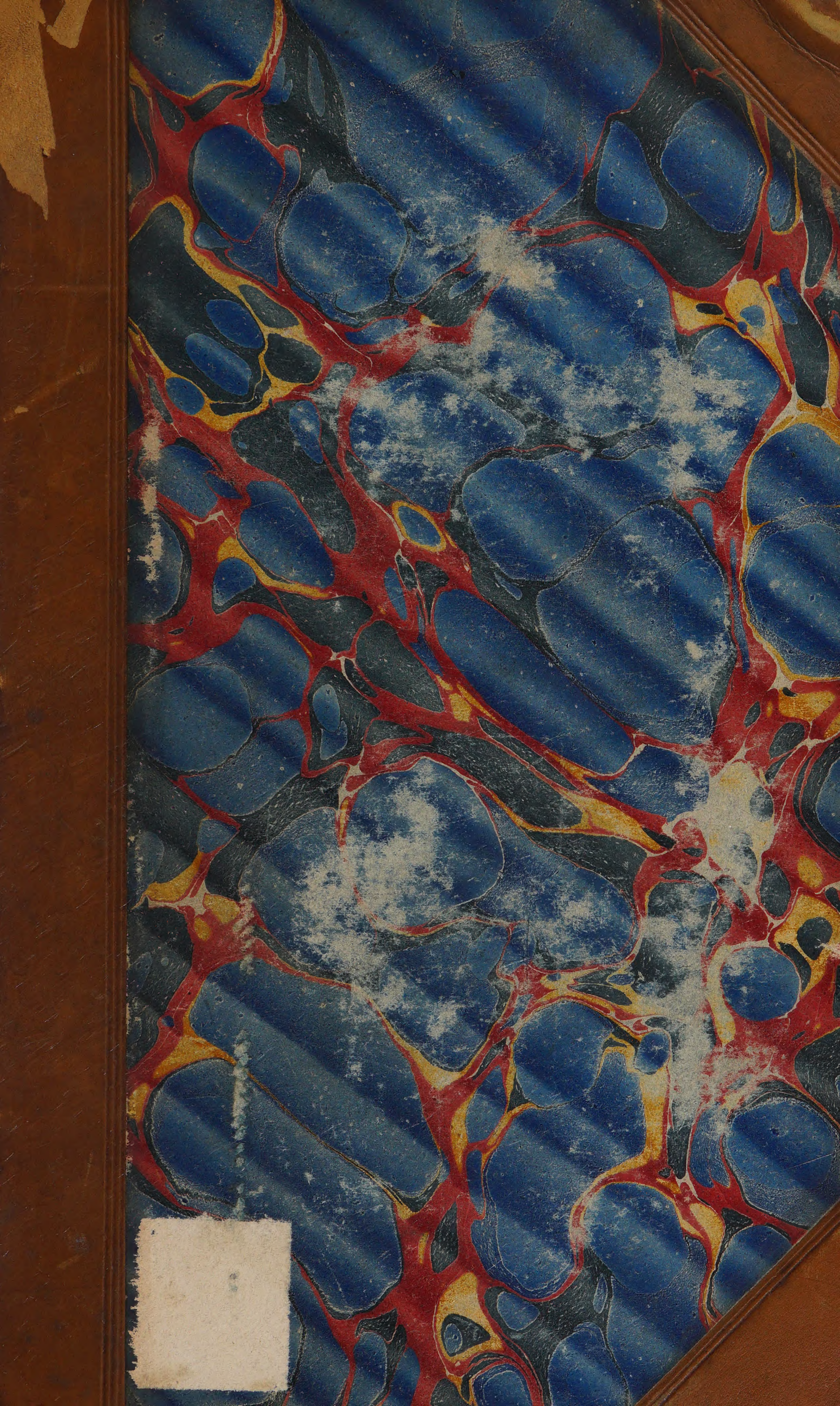

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THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. I.—JULY 1st, 1853.

THE PHARMACY ACT AND THE BYE-LAWS.

The construction of Acts of Parliament is a fertile source of dispute and litigation, and however carefully an Act may be worded, we are told that a coach and four may be driven through it. Yet many Acts of Parliament, in spite of these imperfections and liabilities, work well, and answer the purpose for which they were designed.

The Pharmacy Act was the result of many years' labour and repeated efforts on the part of the class for whose improvement and benefit it was intended. Its merits and demerits we have already explained and discussed. It has been received by the Pharmaceutists of this country as a boon, likely to raise their status and advance their interests. From the permissive character of the Act, it is calculated to effect this object without interfering with the trading rights and privileges of other persons, consequently the parties concerned in carrying out the provisions of the Act, and turning it to the best account, are the Members of the Pharmaceutical Society, to whom this duty is entrusted. It is in their power to realise all that is contemplated in the Act, or to neglect it and lose the benefit designed for them. They are the parties concerned in the regulations made and established under the Act, and if they agree among themselves they are not likely to be impeded in their progress or opposed in their wishes. They are empowered to regulate the qualifications of Pharmaceutical Chemists, and to settle the terms and conditions upon which those who desire to come under the provisions of the Act are to be admitted to this privilege.

The discretionary power vested in the Society, is, however, subject to one limitation, namely, the veto of the Secretary of State, whose confirmation of the bye-laws is required. This proviso was introduced chiefly on account of the apprehensions expressed by the representatives of the medical bodies, that the Chemists were not competent to be entrusted with the management of their own affairs. It was suspected by some parties that the Members of the Pharmaceutical Society had some ulterior object in view besides the advancement of the art and science of Pharmacy, and that unless placed under some check or control, they would follow in the steps of the Apothecaries, and become medical practitioners. It was thought advisable by the promoters of the Pharmacy Bill to put an end to these doubts and fears, and silence the opposition to which they had given rise, by enacting that the bye-laws of the Society should be submitted to the Secretary of State for approval and confirmation. This it was thought would afford a security against the perversion of the Society to purposes at variance with its original province and intention, and no objection could be urged against a kind of control which would only be adversely exercised in the event of some palpable deviation on the part of the Society from the right path. In the course of the discussion on the bye-laws, which occupied the Council and a special Committee during several months, questions arose on which a difference of opinion existed. Under competent legal advice these differences were maturely considered, fully discussed, and finally adjusted; and the bye-laws in the form in which they were submitted to the Members for confirmation, were supported by the entire Council with the exception of one Member. On most of the questions which had given rise to discussion, mutual concessions had brought all parties to a unanimous decision, but there was one point—and that rather an important one—on which the opposition was maintained against a majority of twenty to one.

The resistance which was made by this minority, reinforced at the Special

General Meeting by three Members of the Society not on the Council, having failed, and the entire bye-laws having been passed by a very large majority at that meeting, the opponents resorted to another expedient. Availing themselves of the veto of the Secretary of State over the bye-laws, and regardless of the consequences which must result from a stoppage of the machinery of the Society, they next appeared at the Home Office, and pursued their opposition with implacable rancour, placing the Secretary of State in the invidious position of arbitrator in a personal dispute which the Members had already settled, so far as they had the power to do so, in the most unequivocal manner. It was not sufficient that of the twenty-one members of the late Council twenty had adopted the bye-laws—that twenty of the present Council had signed a memorial to the Secretary of State in their favour—that a Special General Meeting had confirmed them by an overwhelming majority—the minority, laying aside the usual deference and courtesy in such cases, persisted in their resistance, and the business of the Society was brought to a stand, pending the settlement of a point of law, which having been raised, must be decided on legal authority before the final confirmation of the bye-laws could take place.

As we before observed, it is not at all difficult to find sources of litigation in Acts of Parliament, and in the present instance there are materials for special pleading on both sides, which might furnish profitable occupation for the lawyers. If the opponents of the bye-laws had succeeded in their object, it would have been necessary for the Council to reconsider and alter the bye-laws, to convene a Special General Meeting for their confirmation, and again to submit them to the Secretary of State. Two or three months might have elapsed before the final confirmation could have taken place, and during this interval the business of the Society could not have proceeded. It may be a matter of surprise to some of our readers that a Society, comprising nearly three thousand Members, should have been involved in so much perplexity by the opposition of so small a minority; but it must be recollected that although the difference of opinion had reference in the first instance to the amount of composition fee for Life Membership to be charged to those who were Members at the time of the passing of the Act, the ground upon which the appeal was made to the Secretary of State, was the assertion that the levying of any fee whatever from these parties was illegal. This being a point of law, could only be settled on legal authority, and consequently four opponents, or even one, could raise the question. We could never understand under what pretext they could, on the hypothesis that no fee could legally be charged, sanction a fee of half-a-crown, or admit that if the fee had been five guineas instead of ten, they would not have opposed it. This inconsistency we shall not attempt to explain. The confirmation of the bye-laws by the Secretary of State has settled the question for the present, and as this confirmation is only for one year, and subject to the decision of a court of law, the opponents will have the opportunity of renewing hostilities at a future time. They have already acquired the notoriety of obstructing the business of the Society for more than a month, which has caused much dissatisfaction among the Members, disappointment to candidates for admission, and inconvenience to students coming up for examination. They have involved the Society in legal expenses, and brought upon it the discredit of being divided against itself, and this at a time when it was of the greatest importance to establish its strength and influence under the recent Act of Parliament.

The next meeting of the Council will be held on Wednesday, the 6th of July, when the business of the Society will be resumed, the election of Members will take place, and arrangements will be made for the examination of candidates, to whom due notice will be given.

TRANSACTIONS *
OF
THE PHARMACEUTICAL SOCIETY.

FIRST MEETING OF THE COUNCIL.
June 1, 1853.

ELECTION OF OFFICERS.

The following Members were elected to the respective offices of the Society for the next twelve months:—

Mr. Henry Deane, *President.*
Mr. John T. Davenport, *Vice-President.*
Mr. Daniel Bell Hanbury, *Treasurer.*

COMMUNICATION FROM THE CHANCELLOR OF THE EXCHEQUER.

The following letter was read, being a reply to the memorial of the late Council, addressed to the Chancellor of the Exchequer on the subject of the proposed reduction in the import duties on morphia and its salts, and some other chemicals, and also with reference to the licence for the sale of pepper:—

"*Downing Street, 26th May,* 1853.

"Sir,—I am desired by the Chancellor of the Exchequer to acknowledge the favour of your communication of the 13th instant, complaining of the proposed reduction of the duty on morphia, and have to acquaint you that upon a consideration of all the circumstances of the case, Her Majesty's Government have come to the conclusion not to propose any alteration in the present rate of duty on morphia.

"The Chancellor of the Exchequer regrets that your communication should have so long remained unanswered, but he hopes that you will take into consideration the immense amount of correspondence and work which at the present moment takes place in this department.

"I am, Sir, your obedient servant,

"To Henry Deane, Esq." "R. W. Wilbraham.

It was resolved—"That the President be requested on behalf of the Council to acknowledge the receipt of the communication from the Chancellor of the Exchequer, and to request the favour of a reply to that part of the memorial of the Council which related to the pepper licence."

THE BYE-LAWS.

Mr. Bell reported that he had on Monday, May 30th, had an interview with Lord Palmerston on the subject of the bye-laws, which he had at the request of the late President transmitted to the Home Office on the 11th of May. Lord Palmerston informed him that a deputation of Members of the Society had applied for and obtained an audience in opposition to the bye-laws, and had raised objections, which would require consideration. His Lordship expressed his desire to comply with the request on behalf of the Society; but as it appeared that the Members had a disagreement among themselves on some matters of detail, in which he was not concerned or interested, he felt some hesitation in coming to a decision until the merits of the case on both sides had been duly considered, and requested to have in writing any explanatory remarks which might be necessary in support of the views of the Council. Having briefly explained the nature of the question in dispute, Mr. Bell promised to forward a written communication with the requisite documents—which he had

* In the absence of the Committee, which is not yet appointed, the Transactions are published this month on the authority of the President and Vice-President.

done; but had ascertained from Mr. Waddington that some delay in the decision would be unavoidable, on account of the pressure of other business. He had also thought it right to report the state of affairs to Mr. Brace, who gave it as his opinion that it was not safe for the Council to proceed with the business of the Society until the bye-laws were duly confirmed, as various questions might arise as to the legality of such proceedings. Mr. Bell stated that he had also seen several Members of the Select Committee of the late House of Commons, by whom the Pharmacy Bill had been settled, and had satisfied himself that the bye-laws as passed by the late Council, and confirmed by the Special General Meeting, were in accordance with the intentions of that Committee; but the Bill having become an Act, it must be construed according to the legal interpretation of the words, and the question therefore rested with the lawyers, who by special pleading might raise a variety of arguments on both sides, and cause much delay. In the mean time the Society was at a dead lock, and must wait the decision of the Secretary of State.

The position of the Society under these circumstances having been duly considered, and the Council being, with one exception, unanimous on the subject, it was resolved to memorialize the Secretary of State, and the following memorial was adopted.

The Secretary was instructed to convey or transmit the same to the Members of the Council in town and country for signature, and to forward it to the Home Office.

MEMORIAL.

TO THE RIGHT HON. LORD VISCOUNT PALMERSTON, M.P., SECRETARY OF STATE, &c. &c.

The undersigned Members of the Council of the Pharmaceutical Society of Great Britain, respectfully submit for the consideration of your Lordship the following statement in reference to the Bye-laws of the Society:

The said Bye-laws were framed by a Committee of the late Council, under the legal advice of Mr. Tidd Pratt. They were almost unanimously adopted by the Council, and duly confirmed by a very large majority at a Special General Meeting of the Members convened for that purpose, on the 11th of May.

The present Council was elected on the 18th of May, after the Bye-laws had been for several weeks in circulation among the Members.

The former Bye-laws having on the 18th of May ceased to be in force, the business of the Society cannot proceed until the new Bye-laws have been duly confirmed by one of Her Majesty's Principal Secretaries of State.

At a meeting of the Council held this day, it was resolved that a Memorial should be addressed to your Lordship, signed by those members of the Council who support the Bye-laws, believing them to be conducive to the interest of the Society, and founded on principles of equity and justice to the parties concerned.

The objection taken to the Bye-laws by certain members of the Society is the renewal annually of the register of those parties who have been registered as Pharmaceutical Chemists, on the ground of their being Members of the Society according to the terms of the Charter, which requires that they shall subscribe to the funds of the Society in such manner as shall be provided in the regulations thereof.

The opponents of the Bye-laws desire that the register should be permanent, and that the parties so registered shall not be required in future to comply with the terms of the Charter under which the privilege of registration was conferred upon them.

While the Council do not advocate a compulsory payment to the Society, which is established on voluntary principles, they respectfully submit that all who enjoy the privilege of registration under the Pharmacy Act should either pay the registration fees required by the Act, or the subscription to the Society

in lieu of such fees. They believe this to be in accordance with the principles of the Charter and the Act, and are supported in this opinion by Mr. Tidd Pratt, by whom the Bye-laws were settled.

Under the circumstances above detailed, the undersigned respectfully request your Lordship's early attention and the confirmation of the Bye-laws.

(Signed) Henry Deane, *President.*
John T. Davenport, *Vice-President.*

William Southall, Birmingham.
Richard W. Giles, Clifton.
Joseph Gifford, Strand, London.
William Hooper, Great Russell Street.
George W. Sandford, 47, Piccadilly.
William L. Bird, Oxford Market.
William H. Bucklee, 86, New Bond St.
William Murdoch, Glasgow.
John F. Macfarlane, Edinburgh.
James Woolley, Manchester.
Thomas Herring, 40, Aldersgate Street.
Daniel Hanbury, Plough Court, Lombard Street.
Felix Garden, Oxford Street.
John B. Edwards, Liverpool.
George Edwards, Dartford.
Peter Squire, Oxford Street, London.
John Watts, Edgeware Road.
Jacob Bell, 338, Oxford Street.

A few Candidates for election as Members and Associates, whose certificates had been postponed for inquiry by the late Council, were elected, *pro formâ*, subject to confirmation at a future meeting, and the Council adjourned until Wednesday, June 15th.

ADJOURNED MEETING OF COUNCIL.

June 15th.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

COMMUNICATION FROM THE CHANCELLOR OF THE EXCHEQUER.

The President reported that he had communicated with the Chancellor of the Exchequer, in accordance with the resolution passed at the last meeting of the Council, and that he had received the following reply:—

"*Downing Street*, 10th *June*, 1853.

"Sir,—The Chancellor of the Exchequer desires me to acquaint you, with reference to your letter of the 9th instant, that the proposed scale of Excise Licences has been under reconsideration, and he expects in a few days to be able to print the resolutions afresh, which will exhibit to you the intentions of Her Majesty's Government with respect to this question.

"I am, Sir, your obedient servant,

"To Henry Deane, Esq." "R. W. Wilbraham.

THE BYE-LAWS.

The Secretary reported that he had forwarded the memorial which had been adopted at the last meeting, to the Members of Council, either personally or by post, and had transmitted it to the Secretary of State, with a note in which he mentioned the fact that the memorial was signed by twenty Members of Council, the entire number being twenty-one.

Mr. Bell reported that he had seen Mr. Brace, and also Mr. Tidd Pratt, on the subject of the present position of the Society, and had been instructed that inasmuch as the powers vested in the Council by the Charter and the Act were subject to the bye-laws, it was neither expedient nor safe for the Council to proceed with the business of the Society under existing circumstances. It was therefore necessary to defer the examinations and the election of new Members.

Some discussion arose on this subject, as it was observed that it would be a source of inconvenience and disappointment to many who had made arrangements for coming up to the Board of Examiners on an early day, and also to those who were about to be admitted as Members under the new bye-law. It was suggested that this bye-law having been passed and duly confirmed inde-

pendently of the other bye-laws, and the Examiners being expressly recognized in the Act, the election of Members and examinations might proceed. But on further consideration this was deemed inexpedient, as the terms of admission, the fees on examination or registration, the time, place, and manner of conducting the examination, were among the matters enumerated in the Charter and the Act to be regulated by bye-laws, and the Society having no bye-laws the Council could only act on their own personal responsibility. Doubts might arise as to the legality of the proceedings, and the opponents of the Council who had placed them in this difficulty, would be furnished with a pretext for renewed hostilities. The Council, therefore, came to the conclusion that there was no alternative but to suspend the business of the Society until the bye-laws should have been duly confirmed.

Allusion having been made to the sale of Dr. Pereira's library, several Members of the Council expressed the opinion that many of the works in that collection would be valuable additions to the library of the Society, but under existing circumstances the Council did not feel competent to pass a resolution on the subject, the funds of the Society being according to the Charter under the management of the Council, subject to the bye-laws. Some Members, however, took on themselves the responsibility of requesting the Librarian to attend the sale, and to use his discretion in the purchase of a few books which it was important to secure, trusting to the sanction of the Council at a future meeting.

THE CONFIRMATION OF THE BYE-LAWS BY THE SECRETARY OF STATE.

"*Clapham, June* 23, 1853.

"Sir,—Lord Palmerston having confirmed and approved the Bye-laws of the Society as submitted to him, it appears to us desirable that his communication should be published in the Society's Transactions for this month, that the Members at large may be made acquainted with the fact at the earliest possible opportunity. We therefore request your immediate attention to the same.

"Henry Deane, *President*,
"J. T. Davenport, *Vice-President*.

"To Mr. G. W. Smith, *Secretary*."

"*Whitehall*, 17*th June*, 1853.

"Sir,—I am directed by Viscount Palmerston to return to you herewith the Bye-laws, confirmed and approved at a Special General Meeting of the Pharmaceutical Society of Great Britain, held on the 11th ultimo, Lord Palmerston having signified his confirmation and approval of them, as required by the Act of Parliament, for the space of one year from this date, and subject to the decision of a Court of Law upon the legal questions which have arisen, or may arise with reference to them.

"I am, Sir, your obedient Servant,
"H. Waddington.

"*The Secretary to the Pharmaceutical Society of Great Britain*,
17, *Bloomsbury Square*."

"I hereby certify my confirmation and approval of the annexed Bye-laws, confirmed and approved at a Special General Meeting of the Pharmaceutical Society of Great Britain, held on the 11th ult., for the space of one year from this date, and subject to the decision of a Court of Law upon the legal questions which have arisen, or may arise, in reference to any of them.

"Palmerston.

"*Whitehall*, 17*th June*, 1853."

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES

Elected in May and June.

MEMBERS.

Aberdeen	Wilson, George	256, George Street
Alston	Thompson, George	Market Place
Andover	Sincock, William	High Street
Appleby	Longrigg, John	Market Place
Ashton-under-Lyne	Bostock, William	249, Stamford Street
Attleborough	De Carle, Joseph P.	
Axminster	Pryer, William S.	West Street
Banbury	Falkner, Richard	Market Place
Beccles	Steele, Samuel	New Market Place
Bedford	Palgrave, Chas. F.	High Street
Billericay	Nix, John K.	High Street
Birmingham	Adey, Alfred	
	Scott, Edward	1, Easy Row, Paradise Street
Blackburn	Farnworth, William	North Gate
Blackheath	Roe, William Chas.	Tranquil Vale
Blairgowrie	Crarer, John	High Street
Bradford	Sharp, John	79, Westgate
Brechin	Shiress, William	
Bridgewater	Hurman, John	
Bridlington	Smith, William	Centre Market Place
Brierly Hill	Steward, John	High Street
Bristol	Lamotte, Thos. Gallye	Union Street
Bromwich W	Constable, Edwin	Bratt Street
Buckenham	Manning, William	Market Place
Buckley	Wright, Thos. Williams	The Cross
Burnley	Anningson, Josh. Wm.	St. James's Street
Bury St. Edmunds	Hadfield, Fredk. Brown	7, Abbey Gate
Callington	Markes, Chas. Ferris	Fore Street
Cambridge	Lyon, Henry	Petty Cury
Chapel Allerton	Johnstone, Cochrane	
Chertsey	Bicknell, Samuel T.	
	Whitall, James	Guildford Street
Clifton	Hale, Jacob Henry	1, Mall Place
Colchester	Leech, William	33, St. Botolph Street
Congleton	Hadfield, John	High Street
Croydon	Jennings, William T.	"
	Lancaster, Henry	143, High Street
Dedham	Lasham, John	Dedham Street
Denbigh	Edwards, William	High Street
Denton	Arrandale, Elihu	Long Lane
Deptford	Dawson, Stanhope	3, Pomeroy Terrace
Derby	Parker, Frederick	Corn Market
Devonport	Hifley, Richard James	15, Cornwall Street
	Parker, Cottrell	Morrice Town
Dover	Eastes, Thos. Henley	10, Cannon Street
Dundee	Hamilton, Alexander	69, High Street
	Laird, William	West Port Street
	Russell, David	High Street
Dunfermline	Bryce, James	Bridge Street
Durham	Leighton, John Hunter	12, Elvet Bridge
East Grinstead	Pearless, John	
Eccles	Booth, Thomas B.	Market Place
Eccleshall	Smith, Henry	High Street
Edinburgh	Coleman, Abraham	18, Frederick Street
Eton	Wyborn, Thomas	100, High Street
Exeter	Milton, William	High Street
Falkirk	Hardie, James	High Street
Falmouth	Michell, John A.	Market Strand

Fareham	Batchelor, Charles	West Street
Gillingham	Neave, Edward	Market Place
Glasgow	McGregor, Andrew	136, Cowcaddens
Gravesend	Beaumont, William H.	22, New Road
Hackford	Lacey, John	Market Place
Halifax	Wood, Benjamin	53, Northgate Street
Heaton Norris	Patten, William H.	50 and 52, Heaton Lane
Hull	Alcock, George	.
Hyde	Smith, Josias	Market Street
Ironbridge	Hartshorn, Wm. H. T.	Market Place
Jersey	Anderson, Charles T.	St. Heliers
	Duprey, Jean A. B.	"
	Millais, Thomas	"
	Truman, Francis C.	"
Kelso	Sim, George	Wood Market
Keswick	Hogarth, William	Main Street
Kidderminster	Pearce, James	Mill Street
Leeds	Calvert, John Dean	North-hall Street
	Greaves, William	Holbeck, and 30, Vicar Lane
Leek	Johnson, Thomas	Derby Street
Leicester	Ashton, John Swann	Market Place
	Butler, Thomas Edward	
	Merryweather, Charles	High Street
Liverpool	Barber, George	41, Great George Street
	Yates, George	103, Byrom Street
London	Bailey, Delamore, J.	30, Conduit Street
	Barron, Frederick	Bush Lane, Cannon Street
	Bolton, William	146, Holborn Bars
	Coleby, George	93, Cheapside
	Collins, Robert N.	Oxford Court, Cannon Street
	Elam, Benjamin	196, Oxford Street
	Elvey, Thomas	8, Halkin Street, Belgrave Sq.
	Gadd, Charles	New Bridge Street, Vauxhall
	Gosling, William	3, Gray's Place, Brompton
	Gorringe, Walter E.	11, Jonson's Place, Harrow Rd.
	Grisdale, John M.	216, Tottenham Court Road
	Haslam, Simeon	11, Union Place, City Road
	Hulse, Richard	10, Moreton Ter., Kentish Tn.
	Jamieson, John	49, Davies Street
	Johnson, William	254, High Street, Southwark
	Knight, James	Newington, Surrey
	Lever, William	21, Moorgate Street
	Macord, Robert	58, Minories
	Matland, George	10, Nassau Pl., Commercial Rd.
	Messer, Josiah	300, Holborn
	Metzler, John H.	98, Minories
	Sleeman, John	45, Southwark Bridge Road
	Thomas, Henry	1, Little St. Andrew Street
	Vint, James	4, Commercial Ter., Limehouse
	Wegg, William	10, North Pl., Ball's Pond Rd.
	Young, George	Ebenezer Terrace, Mill Wall
Lowestoft	Edmonds, Benjamin M.	High Street
Lyme Regis	Thornton, Edward	Broad Street
Malton	Wrangham, Joseph	Wheelgate Street
Manchester	Aarons, John	473, Rochdale Road
	Bowker, James	68, Great Ancoats Street
	Bingley, Thomas G.	41, Shude Hill
	Davies, Richard	232, Stretford New Road
	Greenhough, George	40, Oldham Street
	Griffiths, John	100, Woodward Street
	Richardson, Allen	90, Bradford Street
Melton Mowbray	Leadbetter, William A.	Market Place
Merthyr Tydvil	Stephens, Thomas	High Street

Narberth	Evans, John	Market Street
	Griffiths, John	Water Street
	Nicholas, John	"
Newcastle-on-Tyne	Mawson, John	Mosley Street
	Waterfall, William	
	Garnett, Joseph	1, Side Street
Newchurch	Sugden, Samuel	Wales Road
New Mills	Sidebottom, William	Market Street
Norwich	Thompson, Henry	St. Stephen's Street
Oldham	Bailey, William	Manchester Street
Oswestry	Saunders, George James	Cross Street
Oundle	Turner, Robert	Market Place
Oxford	Chaundy, Thos. G.	26, St. Aldates Street
Paisley	Buchanan, John	5, High Street
	Hatrick, William	102, High Street
Penrith	Bailey, Richard	Corn Market
Peterborough	Loal, John	Narrow Street
Peterchurch	Jenkins, John	Crossways Street
Pontefract	Priestlay, Henry	Market Place
Rayleigh	Pissey, William	
Renfrew	Glen, James	Canal Street
Romford	Macarthy, James	
Rothesay	Duncan, William	45, Montague Street
	Hicks, George	High Street
Runcorn	Whittaker, William	
St. Day	Corfield, Thomas J. T.	Church Street
Saffron Walden	Miller, Jeptha	Market Hill
Salford	Cottee, William	Chapel Street
	Storey, Thomas	124, Greengate Street
Seaham Harbour	Rutherford, Thomas H.	North Terrace
Sevenoaks	Vincer, Edward	
Sheffield	Collier, William	79, South Street
	Spurr, Samuel W.	114, West Street
	Webster, John	The Wicker
Shipley	Cromack, Francis	Low Well Street
Sidmouth	Talbot, Hugh	Market Place
Sleaford	Obbinson, Thomas	"
Soham	King, William	High Street
Southampton	Hall, John Heaton	Oxford Street
Staines	Baker, George	High Street
	Jones, Edward George	"
Stirling	Burns, James Adam	105, Baker Street
Stockwell	Fells, John	Stockwell Place
Stoke-upon-Trent	Adams, Jonathan H.	High Street
Stratford	Barker, John	
	Howard, John Eliot	
	Kent, Alfred	
Stroud	Sawer, William	Parliament Street
	Withey, William Henry	High Street
Swaffham	Rust, James	Market Place
Uckfield	Foster, John	High Street
Wakefield	Marsden, Richard	Kirkgate Street
	Taylor, John	"
Ware	Harris, Daniel R.	Baldock Street
Wellington	Bishop, William	New Zealand
Welshpool	Jones, Thomas	Broad Street
Wisbeach	Oldham, William T.	Market Place
Woburn	Farrow, William	High Street
Wolverhampton	Meadowcroft, Thomas	Market Place
Woodbridge	Gall, Benjamin D.	The Thoroughfare
York	Croskell, Charles	23, Parliament Street
	Holden, Richard	30, Pavement
	Spurr, John	Goodramgate Street

MAJOR EXAMINATIONS.

Barry, Thomas .....Aberavon
Boyce, John Pierce .....Chertsey
Elsey, Charles .....Horncastle
Hilditch, John . .....Macclesfield
Long, George.....Uxbridge
Mylius, Charles.....London
Needham, Slater .....Leicester
Taylor, John .....Wakefield
Turner, Walter.....Holywell
Turner, William Henry ..... "
Walmsley, Samuel .....Wem
Wood, William Chancellor .....Maidstone

MINOR EXAMINATIONS.

*Bell, Francis .....Wakefield
*Hardy, Richard.....Newark
*Kirk, John.....Leicester
Lloyd, Henry.....Richmond
Moorhouse, Stephen ... .Stoke-on-Trent
*Preston, Richard .....London
*Pring, Walter ....Taunton
*Stedman, Charles .....Aylesbury
*Sturton, Richard .....Peterborough
*Williamson, David .....Brighton

* Honorary Certificates.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH.	TOWNS.
Bainbridge, Charles	Mr. Nicholson	Durham
Ballard, Thomas	Mr. Giles	Clifton
Banks, Morris	Mr. Banks	Birmingham
Batchelder, John	Mr. Smith	Norwich
Bell, John	Mr. Sowerby	Carlisle
Benson, Joseph P.	Mr. Lamb	Manchester
Bells, George William	Mr. Millns	Spalding
Bevan, Lewin G	Mr. Tozer	Exeter
Beveridge, James M.	Mr. Hassard	Woolwich
Billington, William Henry	Mr. Williams	Chorlton
Booth, Henry	Mr. Booth	Rochdale
Bradfield, John	Mr. Quincey	Lynn
Briggs, James A	Mr. Briggs	Tipton
Brinvenu, John	Mr. Palk	Exeter
Calvert, John	Mr. Trueman	Durham
Carter, Edmund	Mr. Whinfield	Gloucester
Chater, Edward M.	Mr. Chater	Watford
Cocking, Henry	Mr. Cocking	Ludlow
Collett, William J.	Mr. Row	Norwich
Coward, Edward	Mr. Morton	Durham
Crofts, John Thomas	Mr. Cooke	Norwich
Dickins, Benjamin	Mr. Kendall	Stratford
Down, Cornelius	Mr. Griffith	Slough
Dowsett, Arthur	Mr. Baker	Chelmsford
Dunn, James	Mr. Burdon	Durham
Dyer, Henry S	Mr. Dyer	Exeter
Earland, William	Mr. Davies	Hay
Ellidge, George	Mr. Clarke	Durham
Fielder, Henry R.	Mr. Fielder	Warminster
Foottit, George R.	Mr. Rogers	Newmarket
Gaskell, John	Mr. Wilson	Canterbury
Gill, Levi John	Mr. Tucker	Bridport
Graham, Ralph	Mr. Fairweather	Newcastle
Gunn, Frederick T.	Mr. Cross	Shrewsbury
Hall, Alfred F.	Mr. Ramsey	Ashford

NAMES.	RESIDING WITH.	TOWNS.
Handson, C.	Mr. Handson	Stamford
Hanner, Walter J.	Mr. Chaston	Lowestoft
Harrison, Henry	Mr. Harrison	Carlisle
Heanley, Marshall	Mr. Babington	Peterborough
Herbert, Henry	Mr. Groves	Blandford
Hodgson, Robert	Mr. Thompson	Sunderland
Holroyd, William H.	Mr. Outhwaite	Bradford
Huggins, Richard	Mr. Tanner	Exeter
James, Daniel E.	Mr. Phillips	Haverfordwest
James, Robert	Mr. Fletcher	Nottingham
Jones, Richard Lewis	Mr. Jones	Narberth
Lay, Edmund H	Mr. Cooke	Norwich
Leete, John	Mr. Huggins	Barnet
Le Feuvre, Francis	Mr. Ereaut	Jersey
Lewis, Edward J.	Mr. Anderson	Worcester
Long, Alfred	Mr. Noakes	Brighton
Lucas, John F	Mr. Jeyes	Northampton
Marston, Alfred	Mr. Cocking	Ludlow
Maudsley, William	Mr. Barnes	Preston
Morris, Pierce	Mr. Watkins	Walsall
Moverly, Robert	Mr. Dingley	Maidstone
Oliver, Nicholas	Mr. Lister	Durham
Parr, Robert	Mr. Wellington	Oakham
Parry, Griffith G	Mr. Birch	Mold
Parry, Owen	Mr. Roberts	Holyhead
Pearce, Henry Thomas	Mr. Pearce	Gloucester
Pepper, Adolphus	Mr. Stuart	London
Phillips, John	Mr. Dennison	Dudley
Pilcher, William John	Mr. Davis	Folkestone
Pile, George	Mr. Gordelier	Sittingbourne
Pullan, John R.	Mr. Gascoigne	Harrogate
Rayner, William	Mr. Wilson	Canterbury
Richards, T. L.	Messrs. Bowers	Chester
Roberts, Albinus J.	Mr. Williams	Horsham
Rosevear, Drew V.	Mr. Palk	Exeter
Seymour, Henry	Mr. Visick	"
Sharpe, Robert	Mr. Grimmer	Norwich
Sheldon, Thomas	Mr. Loggin	Stratford-upon-Avon
Shephard, F. M.	Mr. Beedell	Tiverton
Simmons, Jonathan D.	Mr. Kinch	Henley
Smith, Adam	Mr. Harris	Northampton
Smurthwaite, Greenwell	Mr. Burdon	Durham
Stanways, Thomas S.	Lea and Co	Worcester
Stevens, H. W.	Mr. Hitchcock	Colchester
Storey, Theophilus	Mr. Naylor	Newcastle
Strangeways, George B.	Mr. Reinhardt	Leeds
Swift, William	Mr. Judson	Ripon
Taylor, Alexander B.	Mr. Niddie	Montrose
Teasdale, Thomas	Mr. Myers	Newcastle
Thompson, John R.	Mr. Thompson	Sunderland
Tucker, Henry	Mr. Kinch	Henley-on-Thames
Warne, Charles Henry	Mr. Rogerson	Bradford
Watson, Walker	Mr. Iliffe	Nuneaton
White, William	Mr. Trueman	Durham
Whitworth, John	Mr. Lowe	Liverpool
Williams, Josiah	Mr. Brend	Swansea
Williams, Frederick	Mr. Anderson	Worcester
Wiltshire, Alfred	Mr. Pearce	Gloucester
Wood, Edmund	Mr. Pooley	Bath
Young, John	Mr. Anderson	Musselburgh
Young, Ralph	Messrs. Gilpin	Newcastle

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square*, *May* 2.

ROBERT BENTLEY, ESQ., F.L.S., &c., PRESIDENT, IN THE CHAIR.

Several new Members joined the Club.

A Donation of British plants, from Mr. J. C. Braithwaite, was announced.

Mr. Bowen, of Bideford, sent a series of fresh flowers from North Devon.

Mr. D. Hanbury exhibited the following specimens:—

1. Ravensara nuts, produce of *Agathophyllum aromaticum*, a tree of Madagascar; where they are used as a spice, and whence they have occasionally been brought to France.

2. Casca pretiosa, the bark of *Mespilodaphne pretiosa*, a native of Brazil. It is highly valued as an aromatic. Nat. Ord. Laurineæ.

The Secretary presented a Report of a Meeting of Members of the Club, resident at Worcester, held April 22, when the "Worcester Branch of the Phytological Club" was formed. A few simple rules were adopted, providing for periodical meetings, herborizing excursions, the formation of a local herbarium of plants found in the county, &c. A standing note was appended to the rules, to the effect, "That members be exhorted to be particularly observant of Professor Bentley's truthful remarks on the destruction of habitats for scarce plants—never to allow their love of *collecting* to supersede their love of *botany*." Considering the assistance that more experienced botanists of the neighbourhood could confer, in the formation of a county herbarium, it was resolved, "That Edwin Lees, Esq., F.L.S., the Rev. J. H. Thompson, and T. Westcombe, Esq., be invited to become honorary members." The commencement of a library was proposed, and a few books were presented for this object.

Mr. J. S. Walker, Mr. Baxter, and Mr. W. T. Gissing, were appointed the committee, Mr. Walker to be chairman, and Mr. Gissing secretary.

The Secretary read a letter from E. Newman, Esq., F.L.S., &c., asking information upon the *uses* of ferns throughout the country, for the forthcoming edition of his "British Ferns."

Mr. Newman enquires—1st. Are there any species of British ferns used in medicine?

2nd. Which *species*, and under what *names?* On this subject three provincial Chemists have assured me, that *Polypodium vulgare* of botanists is the *Polypodium Filix-mas* of pharmacy, and I have verified this nomenclature in one instance.

3rd. Whether the use of ferns in medicine is founded on their ascertained properties or on ancient predilections?

4th. Whether the use is increasing or decreasing?

He concludes "This and all other information connected with British ferns will be thankfully received, by yours, most truly, Edward Newman."

The President hoped that the queries just read would elicit the response they deserved. A wide field of usefulness lay open to the Club, in collecting statistics of the popular employment of native plants in different parts of the country. Communications upon the subject, addressed to "The President or Secretary of the Phytological Club, 17, Bloomsbury Square," would always prove acceptable. Mr. Newman's second query showed that confusion of species had in some instances occurred; however, the true *Lastræa filix-mas* was certainly in use.

Two or three members spoke of the employment of *Ophioglossum vulgatum* for the preparation of a very popular ointment in the counties of Essex, Herts, and Devon.

A letter was also read from Dr. William Lander Lindsay, F.B.S.E, &c., of Edinburgh, who wished to obtain co-operation in an investigation of the lichens, which he had undertaken. Dr. Lindsay writes—"Availing myself of the valued medium of the Club, I shall take the liberty of stating the points on which at present I desire information (and, so far as easily attainable, specimens) viz.:—

1. The various lichens used in Britain and other countries in the manufacture of dyes, on the large or small scale (*e. g.* the various "orchella weeds," and other "weeds" and "mosses" employed in the making of Orchil, Cudbear, Litmus, &c.).

a. Their names.—1 Commercial (trade names).—2. Botanical (scientific), with notes of their different qualities and varieties.

b. Commercial value.

c. Geographical source: whence imported, and by what channels.
d. Markets: where bought and sold chiefly.
e. Mode of manufacture.
f. What lichens are used in the manufacture of particular dyes—and why.
g. Relative value of various species of *Roccella*, *Lecanora*, *Gyrophora*, *Umbilicaria*, *Parmelia*, *&c.*
h. Whether any indigenous lichens or species other than those usually employed have been, or are used by manufacturers in the preparation of their pigments. If so, what is the opinion of their comparative colorific value; and how far are they suitable as substitutes for the roccellas, &c.

2. Pigments prepared from these various sources, *e. g.* orchil, cudbear, and litmus.
a. Modes of manufacture, at home and abroad.
b. Names.
c. Qualities and varieties: on what modifications of process of manufacture dependent.
d. Commercial value.
e. Special applications to the useful and fine arts, with 1. Process of dyeing; 2. Modes of fixation of colour; 3. What dyes most suitable for particular textures, and *vice versa*; 4. Notes on the beauty, permanence and value of the various lichen dyes, especially with reference to silks, wools, and similar fabrics.
f. Markets and fields of manufacture: *i. e.* where chiefly made and sold.
g. What are the essential points of difference between orchil, cudbear, and litmus, as depending on modifications of their manufacture, chemical composition, &c.
h. Whether and to what extent do manufacturers and others use chemical tests of the colorific power of a lichen, previous to manufacturing a dye from it. If not, how do they judge of its probable value ?

3. References to manufacturers, dyers, drug merchants, and others, who may be willing as well as able to supply information on any of the above mentioned topics, or specimens illustrative thereof.

Mr. Blyth drew attention to the subject of the ergotism of grasses. During the summer of last year he had observed its prevalence amongst almost every species of grass in certain localities; these were upon a heavy clay soil, and on the shady sides of hedges. It would be remembered that the cold and dry spring, which retarded vegetation, was succeeded by heavy rains at the period of inflorescence of the cereals and then by intense heat.

Specimens of ergot, collected from a number of grasses, were placed on the table. Some of the same sample had been employed by Dr. Tyler Smith at St. Mary's Hospital, and had proved far more efficient than the ergot of rye. The question of its substitution was therefore one of much interest; and it was most desirable that any opportunities for its collection should be embraced, in order to place in the hands of the medical profession a supply for further experiments.

The influences upon which the disease depended were still a contested subject; and it was to be hoped that simultaneous observations of Pharmaceutists, in different parts of the country, during the ensuing season, would assist in clearing up some points involved. It would be important to notice the character of the soil, the temperature of the air, the amount of rain, and the periods of vegetation at which it had fallen; also whether sunshine had prevailed.*

The President exhibited some specimens received from Captain Kennedy, late Commander of the Prince Albert, one of the vessels engaged in the search after Sir John Franklin. Firstly, the dried flowers with a few leaves of *Ledum palustre*, employed extensively as a substitute for tea in various parts of North America. The plant in question is commonly called narrow-leaved Labrador tea, and is an inhabitant of the colder part of Canada, the coasts of Newfoundland and Labrador, and the whole of Rupert's Land to the Arctic Sea, on whose shores it grows from Repulse Bay to Kotzebue Sound. According to Dr. Asa Gray it is not found south of the United States boundary line. This plant was formerly found on the north-

* An excellent popular account of the subject will be found in a little book, entitled *Blights in the Wheat*, by the Rev. E. Sydney. Religious Tract Society.

west coast of Ireland, and used to be included in the lists of the British Flora; but it is now very properly omitted, as having no claim to be considered native.

An infusion of the flowers and leaves possessed an astringent bitter flavour, and a strong, somewhat aromatic heavy odour. It certainly appeared to produce a slight narcotic effect, which is not surprising when its alliance to the rhododendron, kalmia, azalea, &c., all possessing poisonous narcotic qualities, is considered. The leaves are stated to be used in the preparation of beer, which they render extremely heady.

Two other plants of the same natural order, *Gualtheria procumbens* and *Rhododendron lapponicum*, are in use in North America as substitutes for tea.

Pemican, an article of Arctic diet, composed of buffalo meat mixed with marrow and the fruit of some tree, was also exhibited by Mr. Bentley, on account of the latter ingredient. This fruit is a small black pome, nearly agreeing with the Zante currant in size and flavour. Sir J. Richardson, in his *Journal of a Boat Voyage through Rupert's Land*, states that two fruits are used for mixing with pemican, viz., *Cerasus Virginiana*, or choke-berry, and *Amelanchier Canadensis*, shad berry or service berry. The fruits then under consideration were evidently derived from the last-named plant.

The following paper was read:—

ON A LOBELIA USED MEDICINALLY IN PERU.

BY WILLIAM PENNEY.

A few weeks since Mr. Daniel Hanbury handed me a specimen of *Lobelia* which he had received from Mr. A. J. de Warszewicz, a German botanist, travelling in South America. It was found in the village of Jarobamba, five leagues from Arequipa, in the district of Conchumia, Peru. It is evidently a *Lobelia*, agreeing in its characters with that genus. A monopetalous epigynous exogen, with a two-celled ovary, syngenesious anthers, stigma surrounded by hairs, and valvate irregular corolla, it is at once recognized as belonging to the family Lobeliaceæ. I have carefully examined it and compared its characters with De Candolle's description of the *Lobeliæ*, and have no doubt of it being the *Lobelia decurrens* var. β of that author, described in his *Prodromus*, part vii., p. 384. The *L. decurrens* is described and figured by Cavanille in his *Icones et descriptiones plantarum quæ aut sponte in Hispaniâ crescunt aut in hortis hospitantur*, tom. vi., p. 13, t. 521.; and also in the *Botanical Register*, vol. xxii, t. 1842. This variety, under the name of *L. foliosa*, was noticed by Bonpland in 1808; it agrees with Cavanille's plate entirely, except that the tube as well as the lobes of the corolla are externally hairy; the leaves and lobes of the calyx and corolla are much alike. It is described, but not figured, in the *Nova genera et species plantarum Americanarum* of A. Bonpland, A. de Humboldt, and C. S. Kunth, tom. iii., p. 242. The *L. decurrens*, according to Cavanille and De Candolle, grows in Chili, on the banks of the river Claro. Bonpland gives, as the habitat of this variety, Peru. Kunth says it grows in the kingdom of Quito, near the village of Guancabamba. Mr. de Warszewicz states that it grows on the river Arequipa, in Peru.

Presl, in his *Prodromus Monographiæ Lobeliacearum*, includes these two varieties as distinct species, under the names of *Rapuntium decurrens* and *R. foliosum*. Like other Lobeliaceous plants, it appears to be very acrid, its aqueous infusion has a burning and acrid taste, not unlike that of tobacco, and its smell is irritating and nauseating. It is used as a medicine by the natives of Peru. Mr. de Warszewicz states that its action is remarkable in nervous fever; that in Arequipa one, two, or three grains of the leaves and flowers, in the form of powder, are given as a dose to adults, and are found speedily to change the symptoms of the patient; that it is very active as an emetic and purgative, and that the Indians universally employ it as an emetic. He thinks it might be used here as a substitute for ipecacuanha. The roots, which are from four to eight feet in length, are used as well as the flowers and leaves.

Mr. de W. is very desirous that a trial of the plant should be made in this country; he hopes it may prove a more important addition to our Materia Medica than the *Lobelia Syphilitica*, and says that it may be obtained in large quantities from Mr. Harmson, of Arequipa.

Mr. J. J. Muskett read an interesting paper "On the Phytology of the Middle Ages." He premised, that so little evidence of botanical knowledge has been handed down to us in the writings of the ancients, that we have to seek it in traditions and the

remains of old workmanship. The light which these throw must be regarded, not as illustrating a science, but as tracing the uses of plants, and the adaptation of vegetable forms to the arts, among the people of olden time. Theophrastus, the disciple of Aristotle, is the earliest writer upon vegetables, whose works remain to the present day. In his *History of Plants*, written about 300 B.C., vegetables are divided into seven classes, and about 500 species are described. Dioscorides, physician to Antonius and Cleopatra, mentions 600 species, which he divides into aromatic, alimentary, medicinal, and vinous. Pliny the elder, in his *History of the World*, treats the vegetable kingdom under the heads of trees, shrubs, and herbs. After the fall of the Roman Empire, Arabia became the theatre of botanical research, and continued so from the eighth to the twelfth century. History has handed down a few obscure names of writers on the subject in Europe during this period.

The leech or physician was the great botanist of the middle ages. His Pharmacopœia was anything but simple, and the preparation of his philters, salves, and potions, mysterious and unintelligible : the moon must be in the right quarter, and evil spirits be driven off. The Materia Medica of mediæval times contained many things that excite the risibility or shock the delicate nerve of the moderns. Moss from a dead man's skull was a very famous remedy. Plants were often employed as charms. Thus the flowers of the anemone, gathered in spring, were carried about to ward off pestilence. A remedy for hernia in children consisted in drawing the child thrice through an aperture made by splitting a young ash-tree, which was then closed and bound up again. " As fast," it was said, " as that tree recovers, so shall your child recover." In the neighbourhood of Romney grows the Roman nettle (*Urtica pilulifera*). This is its origin according to Camden. The Romans had strange ideas of Britain ; giants, thought they, infest her mountains, serpents abound in her plains, the sun shines not on her, gloom and clouds hang over her, and mad indeed must he be who ventures on her inhospitable shores. Their generals, however, made the venture, and, says Camden, "the Roman soldiers were told, that the climate of Britain was so cold that it was not to be endured without some friction to warm their blood, so they brought nettle-seeds with them, and sowed them there, in order that they might apply the plant to their bodies, to prevent the numbness of that wintry clime." The associations of particular plants with religious observances or the eras of social life, have been handed down to our own times, although divested of the superstitions which formerly attached to them. Still, we welcome Christmas with the scarlet-berried holly, and May-day with flowers; snow-white flowers deck the bride, and rosemary is strewed over the dead. The billets of our ancestors were really pieces of wood, and not sheets of paper. In fact, our word book is derived from the Anglo-Saxon *beorc*, a birch-tree, birchwood being the material used in their records. It was cut into small rods or staves, on each face of which a line was graven : these were generally verses, and the word *stave*, as applied to a stanza, is probably a relic of the practice. The inhabitants of the Indian Archipelago still write on slips of bamboo with a bodkin.

Any one who consults the rolls of the Herald's Office is surprised to find how often members of the vegetable kingdom occur in armorial bearings, and how many families are named from a plant or tree adopted as a badge by their ancestors. Æsc or Æric, the son of Hengist, and founder of the Anglo-Saxon kingdom of Kent, derived his surname from Æsk, an ash-tree: perhaps his ashen spear won him the cognomen. Heraldry, as a science, may be said to have commenced with the Crusades. Then it was that Henry, Count of Anjou, afterwards Henry the Second, adopted for his badge the broom (Norman French *planta genet*), whence his surname Plantagenet. The ancestor of the Okes painted six golden acorns and oak leaves on his black shield; the Thornholms bear three green thorn-trees; the family of Sevenokes or Senokes seven golden acorns on a blue ground; while the Palmers have three palm branches. The badges of nations have usually a vegetable origin: thus the rose of England, the fleur-de-lis of France, the thistle of Scotland, the shamrock of Ireland, and the leek of Wales. The ancestors of the illustrious Linnæus are said to have derived their name from a large lime or linden-tree which grew upon their farm. Linnæus himself adopted as his symbol the exquisite little plant which has been named after him, the Linnæa borealis. A rude figure of this, with the motto "Tantus amor florum," appears on the title-page of the copyright editions of his works. None of the arts are more indebted to suggestions from vegetable forms than architecture. Tents appear to have formed the earliest

dwellings of mankind, but in course of time it is supposed that a kind of log-house was constructed, with a rude verandah supported by the trunks of trees, and yielding a shady retreat from the scorching sun. Egypt embodied the idea in stone, whilst the capitals of the pillars were formed of leaves, as if to mark their origin. It was, however, animals that chiefly supplied the architects of Egypt, like the builders of the palaces of Nimroud, with their models of form.

The classic orders of Greece transformed the log-hut into the marble temple with its columned portico. The acanthus leaf suggested the Corinthian capital, and has been handed down through the composite style of the Romans to the Gothic. In this last it is shown in the uncouth Norman of our land and the pretty Romanesque of the continent. No one who visits our ancient country churches can fail to observe the remains of the acanthus leaf in the rude foliated capitals of the Gothic pillars. The decorated English is a style pre-eminently botanical in its details The splendid cathedral of York is the finest instance of this: the vista of the nave suggests an avenue of forest trees; the pillars represent the trunks; the spreading ribs of the vaulted roof the branches; and the bosses themselves are often a group of leaves. The windows, with their exquisite tracery, convey the idea of looking through the tangled canopy of leafy branches. The origin of such adornments as the cinquefoil, quatrefoil, and trefoil, is obvious.

Mr. Muskett illustrated his paper by a number of drawings of architectural subjects referred to, rubbings of monumental brasses, &c.

The President announced that the next meeting would be held on Monday, June 6, at a quarter before nine P.M.

MEETING HELD JUNE 2—THE PRESIDENT IN THE CHAIR.

The Curators announced the receipt of parcels of plants from Messrs. Bushell (Crawford Street); P. Corder, A.L.S. (Bedford); Braithwaite; Hanbury; Giles (Clifton); Morgan (Llandilo); Shipley and Brady (Leeds); Jessopp and Reynolds.

Specimens of Claytonia perfoliata (*Portulaceæ*) were laid on the table. This plant is a native of North America, and appeared some few years since at Ampthill, Beds., without any clue to its origin having been traced. It has been eaten as a salad, and also when boiled, being said to equal spinach. It increases so rapidly as to have become troublesome at the Chelsea Gardens and elsewhere.

Mr. Muskett presented a translation of a paper by M. de Lacaze Duthiers, entitled "Researches upon the Structure of Galls," published in the *Comptes Rendus*, April 4, 1853.

The author commences by stating that former writers upon the vegetable pathological productions, named galls, have only considered their forms, the plant upon which they are found, and the insects which cause them. Their structure and development have been completely neglected.

Galls are generally considered as purely cellular masses. This is an error, for they contain the principal elements and tissues which enter into the composition of plants. They may be divided into external and internal galls, from their relations to the vegetable which bears them. The first project outwards, and are only connected with the plant by a very small peduncle; the second kind are developed within the tissues and organs they deform.

External galls are sufficiently naturally divided into unilocular and multilocular, from the number of cells which they contain.

The unilocular class may be divided into five groups, whose structure is more and more simple as it recedes from the first type. This type is represented by the large gall of commerce and the French gall. If taken when fully developed, they exhibit from the surface to the centre,

1. Epidermis without stomata.
2. Cellular sub-epidermal layer, analogous to the cellular tissue of vegetables, containing colouring matter.
3. Zone of irregular ramose cells, with large cavities: the spongy layer.
4. Layer of hard, prismatic, dotted cells.
5. Layer of very thick, polyhedral cells, very hard, much dotted, and forming the protecting layer to the nucleus.
6. Central alimentary mass of soft cells filled with liquid, the external part containing starch-granules colourable by iodine, the internal not producing this reaction.

The central amylaceous mass disappears gradually during the development of the larva, which does not commence its metamorphoses until it has consumed all the alimentary portion. May the most internal portion be regarded as fecula, modified by a process analogous to the commencement of digestion; or rather as matter more specially azotized, serving for the first phases of embryotic development? The French gall, like that of commerce, contains fibro-vascular bundles, which pass from the point of insertion towards the centre, and ramify in the interior of the parenchyma. We find in these bundles fibres, branching and dotted vessels, and true spiral vessels. These disappear successively and give the five groups of external unilocular galls before mentioned.

1. Hard and spongy. (French gall and gall of commerce.)
2. Hard. (Spherical galls on oak-leaves.)
3. Spongy. (Cellular oak-galls with regular tubercles.)
4. Cellular. (Lenticular galls on oak-leaves.)
5. Protecting layer disappears, the sub-epidermal cellular tissue only remains. (Spherical galls on briar.)

Compound or multilocular external galls are due—

1. To cohesion of simple tumours, allied to the fifth group described above. (Briar-gall.)
2. To the development of a hollowed cellular mass. They may be compared with different groups of the unilocular, being sometimes hard (tumours on roots of oak) or spongy (oak-apples).

In all the external galls, whether simple or compound, the fibro-vascular bundles are placed on the outside of the protecting layer.

Internal galls are true or false.

True galls contain the insect in the interior of their tissues. They are hypertrophies, and have their seat upon all parts of the plant—on the parenchyma, the nerves, the petioles, the cellular tissues, cortical fibres, medullary rays, and the pith.

False galls are hypertrophies, deforming the organs and affording the insects protection and nourishment; but the parasites are always on the outside of the tissues of the plant. To this division belong the egg-masses of aphides, found on the leaves of the poplar, lime, elm, &c., and the nodosities of the trunk of the apple-tree.

The vegetable hypertrophy, in whatever form of gall it develops itself, does not cause the disappearance of any of the organic elements; it increases their number and volume, and modifies their form.

The *cause* of external galls is the deposit of a liquid venom with specific properties, a true morbid poison, secreted by the insect, which deposits it in the plant with its eggs. The form, consistence, &c., of the tumours, vary with the specific properties of the virus of which they are the consequences. Internal galls, and more especially the false, appear to owe their formation, as Reaumur has shown, to the abstraction of the liquids of the plant, by the suction of the aphides. This abstraction, in augmenting the vitality of the part, determines also its hypertrophied growth.

We could make a third general division, presenting at the same time the characters of external and internal productions; *e. g.* artichoke galls.

The paper elicited considerable discussion

The next Meeting will be held on Monday evening, July 4, at a quarter before nine o'clock.

ORIGINAL AND EXTRACTED ARTICLES.

ON WHITE OR IMPERIAL RHUBARB.

BY DR. G. WALPERS.

In all works on Pharmacology there occurs a somewhat vague account of a very superior kind of rhubarb, said to be collected for the sole and particular use of the Imperial Court of St. Petersburgh, and distinguished by the name of *White* or *Imperial Rhubarb (Radix Rhei alba seu imperialis)*. It is described as a rhubarb root in which the white portion so far predominates, that only a few red streaks are perceptible upon the surface of a transverse section. No one, however, is from personal knowledge acquainted with this species of rhubarb. In order to put an end to these doubts, I some time since addressed a letter to Mr. Büchner, chief Apothecary to the Imperial Court, begging him for a small specimen of this

"*Imperial Rhubarb*" for my pharmacological collection, or should the communication of this precious drug be inadmissible, that I might at least have an authentic description of it. Mr. Büchner replied to this request with the utmost promptitude, informing me that, after having instituted the most careful inquiries, it appeared that no such species of rhubarb had at any time been imported for the Imperial family; that it had never occurred in commerce; and, finally, that in neither any public or private collection in St. Petersburgh was there to be found a specimen of this (consequently mythical) root.—*Bonplandia*, for March 15, 1853.

[It was the Russian traveller Pallas who first drew attention to the so-called *White Rhubarb*. We extract from his works the passage relating to it: "J'ai vu pendant mon séjour à Kiakta des petits morceaux de rhubarbe blancs comme du lait. Elle est douce au goût, et a les mêmes propriétés que celle de la meilleure qualité. L'apothicaire se proposoit de trier tous ces morceaux, et de les envoyer séparément à Pétersbourg pour la pharmacie de la Cour."—*Voyages de M. P. S. Pallas, en différentes Provinces de l'Empire de Russie, et dans l'Asie Septentrionale, traduits de l'Allemand.* Paris 4to, 1793, tome iv., p. 219.—Ed. *Ph. Journ.*]

PERMANGANATE OF POTASH.

In consequence of the successful use of permanganate of potash in diabetes, under Mr. Sampson, the results of which have been lately published in the *Lancet*, and as it is probable that it will come into more general use, we think a short notice of it will be found useful to our readers.

This salt is formed by the mixture of peroxide of manganese with hydrate of potash; the resulting salt is, however, more abundant, if chlorate of potash be used in addition.

There are several modifications of the process: that of Chevillot and Edwards is to ignite one part of peroxide of manganese with one part of hydrate of potash, dissolve the resulting mass in water, decant the red solution and evaporate, rapidly at first, till small needles appear, then cautiously, that crystallization may go on regularly. Wöhler's (*Pogg.* xxvii., 626) process is as follows: chlorate of potash being kept in a state of fusion over a spirit lamp, hydrate of potash is first added to it, and then an excess of finely divided peroxide of manganese, which immediately dissolves, forming a splendid green solution. The mixture is then heated till the whole of the chlorate of potash is decomposed, and the mass when cold is boiled with a small quantity of water, whereupon the green colour of the solution changes to red; finally, the liquid is decanted from the peroxide of manganese while still hot, and set aside to crystallize by cooling. It crystallizes in all proportions with perchlorate of potash, with which it is isomorphous, the latter salt crystallizes in splendid red crystals, when a small quantity of permanganate of potash is added to its solution. With equal parts of the two salts, the crystals are nearly black.

Gregory's (*J. Pharm.* xxi., 312; also *Ann. Pharm.*, xv., 237) consists in adding to a finely divided mixture of eight parts of peroxide of manganese and seven parts of chlorate of potash, a solution of ten parts of hydrate of potash in a very small quantity of water, evaporating to dryness; igniting the finely-pounded mass in a platinum crucible over a spirit-lamp till the whole of the chlorate of potash is decomposed (for which a low red heat is sufficient), and proceeding as described above. It is readily decomposed by organic matter, so that if it is required to filter the solution previous to crystallization, the neck of the funnel should be filled with asbestos.

The composition of permanganate of potash, according to Mitscherlich, is

	By calculation.		By experiment.
KO	47.2	29.65	30.385
$Mn_2 O_7$	112.0	70.35	69.580
$KO\,Mn_2 O_7$	159.2	100.00	99.965

The crystals are soluble in sixteen parts of water at 60°.

The dose generally found to agree best with the stomach is about three grains, given in three or four tablespoonfuls of water three times a day, a little before meals; much larger doses (as much as ten or twelve grains), however, have been given, but the dose should be gradually increased.

SYRUP OF VIOLETS.

BY MR. FREDERICK KENDALL.

Those of us who have joined in the establishment of the Pharmaceutical Society must, I think, now be satisfied that their labours have not been in vain; for, independent of recent legislation, which we hope may accomplish all that may be desired from it, we may look back with satisfaction upon a great improvement in Pharmacy generally, but especially in the preparation of certain articles, which, through ignorance or fraud, were formerly scarcely to be obtained in a genuine state; but that something remains yet to be done the following statement will, I think, prove; and I am assured that, in most of our large towns especially, the competitive spirit has so beaten down prices, as to place those who desire to act conscientiously, and do their duty to the public, in a very uncomfortable position.

The violet, as is well known, has been for ages employed medicinally; and although it has, like other medicaments, undergone its vicissitudes of favour and neglect with the compilers of our Pharmacopœias, it has never ceased to be employed by the public—until it has at length been introduced again into the Pharmacopœia of 1851, where the syrup takes its old place as an officinal preparation; and I think, with good reason, as there can be no doubt but that the violet has aperient and emetic properties, and hence its universal use as an expectorant and laxative in infantile diseases.

This lovely flower, "the sweetest offspring of the shade," is found in the greatest profusion in the sylvan glades and under the shady hedge-rows of Warwickshire; and especially in this neighbourhood, where it has probably been cultivated in times gone by for medicinal purposes. It is now to be found, sometimes covering the surface of acres in extent, varying with the daisy and buttercup, in enamelling the green turf.

This circumstance has been naturally taken advantage of here, and I believe, for many years, nearly all the genuine syrup of violets to be found in the market has been made in this neighbourhood, where I have every reason to believe it has been, by all the makers, faithfully prepared. I know of no exception to the remark, as to the locality of its preparation, except that I understand it is also made in Banbury. Yet even this small fraction compared with the public demand, has been with difficulty disposed of.

It has happened to myself, that this year, on offering for sale my produce, I was offered a sum for it under its cost to me, and was told that "any quantity" might be purchased at that price. This induced me to examine for myself the character of the article commonly sold under the name of syrup of violets. I procured six samples purchased in London, and the same number from Manchester, and the result of their examination I now submit to you. On glancing at my specimens, I saw at once how it was that my genuine and carefully prepared syrup might remain in my cellars, while "any quantity" of the stuff before me might be purchased at twopence a pound under it. It would require a more graphic pen than I can aspire to, to describe the external appearance of these choice specimens of the Pharmacy of England. Some were purple, some red, some green, some pink, and some scarcely any colour at all.

I will premise a remark or two on the genuine syrup:—When made from violets in perfection it has a pure blue colour, without any purple, and when films of it are examined by transmitted light, the blue is very light indeed. It has very little staining power. Its taste is agreeable, yet slightly mawkish, and its smell is distinctly that of the violet. Its specific gravity is 1.333. Acids produce a beautiful light purple colour, and alkalies a green. Alum and chloride of tin produce no precipitation, but develop a purple colour. Bichloride of mercury partly bleaches it. Its comportment with acids and alkalies, and its colour, taste, and smell, are generally sufficient to distinguish it from its substitutes; thus, with the lichen blues, archil, cudbear, litmus, &c., although they are reddened by acids, yet alkalies have no effect upon them.

Indigo, from which may be produced a colour almost identical with the violet, is not reddened by acids.

From red cabbage it may be distinguished by the taste and smell, but the reactions are the same.

From syrup of pansies it may be distinguished by the colour of the latter being much deeper and more purple, and from the absence of the smell and taste of the violet.

It will be seen in the sequel that in some localities this syrup forms the favourite substitute; and it is admirably adapted to the purpose of the cheapeners, as the colour is so much deeper than that of the violet, that one-fourth of the quantity will produce as deep a colour.

EXAMINATION OF SIX SAMPLES OF SYRUP OF VIOLETS PURCHASED IN LONDON.

No. 1. Sp. gravity 1.332; deep bluish purple colour; no smell or taste of the violet; reaction the same as with syrup of violet.—*Syrup of Pansies.*

No. 2. Sp. gravity 1.236; bluish liquid, depositing on standing a blue powder, leaving the supernatent liquor of a green colour ; neither acids nor alkalies had any effect; nitric acid discharged the colour.—*Simple Syrup coloured with powdered Indigo.*

No. 3. Sp. gravity 1.276; deep blue colour; no taste or smell of the violet; neither acids nor alkalies produced any effect; nitric acid, by the aid of heat, discoloured it.—*Coloured with Indigo, dissolved in Sulphuric Acid.*

No. 4. Sp. gravity 1.280; a slightly pinkish liquid; no taste, smell, or colour of the violet; acids slightly deepened the pink hue and alkalies diminished it.—*Coloured with Syrup of Red Poppy.*

No. 5. Sp. gravity 1.316; a deep purple liquid; no taste, smell, or colour of the violet; it was reddened by acids and greened by alkalies.—*Coloured with Syrup of Red Cabbage.*

No. 6. Sp. gravity 1.312; a pinkish liquid; neither taste, smell, nor colour of the violet; acids slightly deepened the colour, alkalies lightened it.—*Coloured with Syrup of Red Poppy.*

PURCHASED IN MANCHESTER.

No. 1. Sp. gravity 1.276; purple blue colour; no taste or smell of the violet; partially fermented.—*Syrup of Pansies.*

No. 2. Sp. gravity 1.184 ; pinkish colour, much fermented ; acids redden and alkalies green it ; no taste or smell of the violet.—*Syrup of Pansies reddened by developed Acid.*

No. 3. Sp. gravity 1.316 ; slight pinkish blue colour ; no taste, smell, or colour of the violet ; acids produce a slight pink, alkalies a green colour.—*Slightly coloured with Syrup of Pansies.*

No. 4. Sp. gravity 1.316.—*Syrup of Pansies.*

No. 5. Sp. gravity 1.252.—*Syrup of Pansies.*

No. 6. Sp. gravity 1.328.—*Syrup of Pansies.*

Of all the twelve specimens, not one was syrup of violets. Two were coloured with indigo, two with red poppies, one with red cabbage, and the remainder were syrup of pansies. All the specimens contained too little sugar, many of them much too little, and consequently most of them were more or less fermented, and unfit for use on that ground.

Now, Sir, if this is the real condition of things, and if I could persuade myself that it must continue, then I should say *cui bono* to all our efforts to raise Pharmacy from its degraded position; but I have better hopes, not in the competitive principle, for that will only land us in a lower deep, but by the advancement of general and scientific knowledge amongst our members; by the adoption of a higher tone of professional morality, brought about by more frequent communication amongst ourselves; by the diffusion of a deeper feeling of the dignity and importance of our calling as a branch of general and medical science, and of our consequent responsibility as the guardians of our own honour and of the public health.

I do not know that I need make any apology for these remarks, they are prompted solely by a desire for the advancement of my profession. In the matter of sophistications of all kinds, I do think it behoves us all, in our several spheres, to do all we can to put them down. In small matters or in large we should seek to be guided by honourable principles; to shake off the mercenary spirit of mere traders, and to throw aside all those unworthy substitutes and artifices which are the relics and legacy of an ignorant and degraded age.

It has been assumed—I think rashly—that competition to the fullest extent is all that is required to keep the relation between buyer and seller in its proper position, but I believe that thinking and experienced men are beginning to perceive that this principle may be carried too far even in general business; *à fortiori*, how much stronger does the remark apply to the vending of medicines. For myself, I believe that in this country competition has been carried to a most injurious excess, and is really bidding fair to sap the morality of the trading community by inducing too low a range of profits, and the consequent necessity on the part of the trader of making up by trick and chicanery, and every sort of questionable expedient, for the want of fair and honourable profit. In general business and manufactures the problem to be solved is, how to produce an article having the *appearance* of intrinsic value at the least cost, and at the same time to yield the largest amount of profit. In the usual solution of this problem no great harm is done, except a little deception on the public; but in the manufacture of medicines it is otherwise; take the case of the article on which I have been commenting—a substance is produced wholly fictitious, yet having the appearance, or may be made to have the appearance in every respect, of the genuine article, and a large profit is secured to all the parties concerned, but the true interest of the public is wholly sacrificed; and this must necessarily be the case when the cost of the article is made the primary consideration. But I trust, Sir, we may as a body be enabled to take a more conscientious, a more enlarged view of this whole question—a view more befitting the character of men of science and education, to whom the public have committed their interests in the full confidence that we shall not be guilty of the treachery and baseness of violating that confidence for the sake of a paltry pecuniary advantage.

Stratford-on-Avon.

INDUCTIVE VIEW OF ELECTRO-METALLIC DEPOSITION.

BY G. GORE, ESQ.

1. One of the earliest facts discovered in the electro deposition of metals was the precipitation of the metal from metallic solutions, in certain cases, upon other metals simply immersed in them. Thus, if a piece of zinc, cadmium, tin, lead, iron, or cobalt, be immersed in a solution of hydrochlorate of antimony, they will slightly dissolve and become coated with antimony; but if a piece of gold, platinum, or palladium, be immersed in the same solution, it does not dissolve, and receives no coating of metal. Or if zinc, cadmium, lead, iron, or copper, be placed in a solution of a salt of bismuth, they will slightly dissolve, and that metal be deposited upon them. Thus, if a piece of copper be immersed in a solution of twenty drops of nitrate of bismuth in a wine-glass full of water, it will become coated with that metal; but if a piece of platinum be used, it will neither dissolve nor receive a metallic deposit. Or if pieces of copper or brass be boiled with pieces of zinc in a saturated aqueous solution of hydrochlorate of ammonia (sal ammoniac), or in a solution of chloride of zinc, they will become coated with zinc. Or if zinc be immersed in water containing a few grains weight of protochloride of tin and of nitric acid, it will slightly dissolve and become coated with tin; but if gold be used in the place of zinc, no such effects occur. Or if iron be boiled in twenty-two pounds of water, containing 17½ ozs. of alum and 1 oz. of protochloride of tin, it will slightly dissolve and become brightly tinned; but if gold be used in place of iron, it neither dissolves nor receives deposit. Or if pieces of brass be boiled for several hours with pieces of tin in water containing bitartrate of potash, or in water containing peroxide of tin and potash for a few minutes, they will become completely coated with white metallic tin; but if pieces of palladium be used, they neither dissolve nor receive deposit. Or if zinc, iron, or cadmium be immersed in an aqueous solution of acetate of lead (sugar of lead), they will slightly dissolve and receive a coating of lead; but if silver be used, it neither dissolves nor receives deposit. Or if a piece of zinc, tin, or iron, be placed in a solution of sulphate of copper (blue vitriol), the piece of immersed

metal will slightly dissolve and become coated with metallic copper; but if a piece of copper be used, it is not acted upon, and receives no deposit. Or if a piece of zinc be rubbed with dilute sulphuric acid and mercury, it slightly dissolves and becomes amalgamated; but if iron be treated thus, it receives no coating of the metal. Or if copper be immersed in an aqueous solution of nitrate of mercury, it will slightly dissolve and become coated with the fluid metal; but if iron be used, no amalgamation occurs. Or if a piece of copper be immersed in a dilute solution of nitrate of silver, it slightly dissolves and becomes silvered; or if it or brass be rubbed with bitartrate of potash and chloride of silver, moistened with water, the metal will slightly dissolve and receive a thin coating of metallic silver; but if iron be used in either of these cases, it does not dissolve nor become silvered. Or if an iron rod be placed in a solution of nitrochloride of gold, it will dissolve and receive a coating of gold. Or if brass be immersed in an ethereal solution of platina, it will slightly dissolve and become coated with that metal; but if a piece of platina be used, it neither dissolves nor receives deposit. Or if zinc be immersed in a solution of almost any of the salts of uranium, arsenic, antimony, bismuth, cadmium, tin, lead, iron, cobalt, nickel, copper, mercury, silver, gold, platinum, or palladium, it will dissolve and receive a coating of their respective metals; but if almost any of these metals be immersed in a solution of the salts of zinc, they will neither dissolve nor become coated with zinc.

2. Another class of facts, somewhat similar to the preceding, have also been discovered. Thus, if two pieces of different metals be in mutual contact, or be connected together by a wire or other piece of metal, and immersed simultaneously in a metallic solution, in certain cases one piece will dissolve in the liquid, and the other will become coated with metal. Thus, if a piece of tin, lead, iron, copper, or brass, be metallically connected with a piece of zinc, and both be immersed together in $17\frac{1}{2}$ pints of water, containing $10\frac{1}{2}$ ozs. of bitartrate of potash and $\frac{3}{4}$ oz. of protochloride of tin, the zinc will dissolve, and the other metal become coated with tin; but if copper be substituted in the place of the zinc, or a solution of sulphate of zinc in the place of the solution of tin salt, no solution of the copper or zinc will occur, or tin be deposited upon the opposite metal. Or if a piece of iron in metallic connexion with a piece of silver be placed in a solution of sulphate of copper, the iron will dissolve and the silver become coated with copper; but if copper be used in place of the iron, or a solution of sulphate of iron in the place of sulphate of copper, neither copper or iron will dissolve, or silver receive a metallic coating. Or if a piece of copper, in connexion with a piece of zinc, be immersed in aqueous acetate of lead, the zinc will dissolve, and lead be deposited upon the copper; but if a solution of zinc salt be used in place of the lead solution, or if a piece of lead be used in the place of the zinc, or if a piece of zinc be used in place of the copper, none of the effects before mentioned will follow.

3. It has also been discovered, that if two pieces of similar metals be immersed in two different liquids, one of which is a solution of a metallic salt, and the other a liquid capable of dissolving the metal, and contained in the two divisions of a vessel, divided by a porous diaphragm, which allows the two liquids to be in contact without mixture, the piece of metal in the metallic solution will, in certain cases, receive a coating of metal, whilst the metal in the other liquid will dissolve; thus, if one division of the vessel contains dilute nitric acid, and the other a solution of sulphate of copper, and two perfectly similar pieces of copper connected together by a wire be dipped into each, or, if a strip of copper be bent parallel, and its two limbs be dipped into the two liquids, the copper in the dilute acid will dissolve, and that in the metallic solution will receive a deposit of copper; but, if a piece of platinum or gold be substituted for the piece of copper in the dilute acid, or if a solution of sulphate of copper fill each division, no solution or deposit of metal will take place.

4. It has further been discovered, that two different metals may be used

with two liquids in the diaphragm cell in certain cases with similar effects; thus, if zinc and dilute hydrochloric acid be in one division, and copper and aqueous chloride of copper be in the other division, and the two metals be metallically connected, zinc will dissolve and copper be deposited; but if platinum be in the dilute acid and silver in the copper solution, or gold in the dilute acid, with copper in aqueous chloride of zinc, no solution or deposition of metal will take place.

5. Also, by further investigation, it has been found that if the wire which connects the two metals together, either in the arrangement of two metals in one liquid, as of zinc and tin, lead, &c., in a solution of tin salt; or of one metal in two liquids, as of copper in dilute nitric acid and in aqueous sulphate of copper in the diaphragm cell; or of two metals in two liquids, as of zinc in dilute hydrochloric acid and copper in aqueous chloride of copper in the diaphragm cell, be divided, and its two ends be connected with two metal plates which dip into a metallic solution in a separate vessel, the metal plate which is connected with the dissolving plate in either of these said arrangements will in certain cases receive a deposit of metal, and the other which is connected with the receiving plate will dissolve; thus, if the separate vessel contains copper-plates and a solution of a salt of copper, one plate will dissolve and the other receive a deposit of copper; or if it contains a solution of a salt of silver and silver plates, one will dissolve and the other become coated with silver; but if it contains a similar solution of tin salt and bitartrate of potash as in the arrangement of two metals in one liquid before described, with similar metals as zinc and tin, and the two zinc plates of the two separate vessels be connected together by one wire, and the two tin plates by another wire, no deposition of tin upon the tin plates in either cell will occur; or if it contains two tin plates and a solution of chloride of zinc, no deposition of tin in the one cell or of zinc in the other will take place.

6. In each of these cases where a separate vessel containing two similar metals and a similar liquid, as copper plates in a solution of a salt of copper, or silver plates in a solution of salt of silver is used, the separate vessel is called a depositing vessel, because it is used solely for depositing; and it is not capable either of communicating a depositing power to other vessels, or of depositing by itself alone, because its solution and metal plates are all of one kind of metal, and the two plates are in similar physical conditions; and it acquires all its powers of solution and deposition by being connected with the other arrangements previously described, which act towards it as galvanic batteries, and may be termed such because they supply the power.

7. Any one of the many other kinds of galvanic batteries invented may be connected with the depositing vessel with similar results, some with two metals and one liquid, as Smee's battery of amalgamated zinc and platinized silver in dilute sulphuric acid; or of two metals and two liquids, as Grove's battery of amalgamated zinc in dilute sulphuric acid and platinum in nitro-hydrochloric acid; or of two metals and two liquids, one of which is a metallic solution, as Daniells' battery, which consists of zinc in dilute sulphuric acid and copper in aqueous sulphate of copper; and many others with different metals and liquids, and with different arrangements of them, which it is unnecessary to describe.

8. It has further been ascertained that a series of depositing vessels may be connected with one or any of the different galvanic batteries, or with one or any of the foregoing arrangements which act as batteries; also that a series of such batteries or arrangements may, *vice versa*, in like manner be connected with a single depositing vessel, and in each case, with similar results of solution and deposition.

9. There are several other arrangements which are capable by connexion with the depositing vessel of communicating to it in a greater or less degree the powers of solution and deposition; but as we are only treating of the phenomena of electro-deposition, and not of the electric force or its sources, the only

one requisite to notice is the magneto-electric machine, which consists of a series of powerful steel magnets, opposite the ends or poles of which bars of soft iron revolve rapidly, and around each of these bars coils of copper wire covered with cotton are wound, the ends of which are in metallic connexion with the metal plates of the depositing vessel.

10. Having stated in general terms the various classes of instances which include every case of electro-deposition that has been known to occur, and illustrated each class by particular instances, both positive ones in which the phenomena do occur, and negative ones in which they do not occur, we now pass on to explain by general statements and their illustrations the *conditions* under which the phenomena are manifested, or the *principles* of electro-deposition.

11. It has been ascertained that one of the essential conditions of deposition, in all cases, is, that a difference of chemical affinity must exist between the dissolving and receiving metals for the liquid or liquids in which they are immersed; and that, in every case, the dissolving metal must have a stronger affinity for the acid or other dissolving element of the liquid than its associated receiving metal; either in consequence of the metal and liquid being different, as iron in a sulphate of copper solution; or of the two metals being different, as zinc and tin in a tin solution; or of the two liquids being different, as copper in dilute nitric acid and in aqueous sulphate of copper; or of both metals and liquids being different, as of zinc in dilute hydrochloric acid, and copper in aqueous chloride of copper; or of being connected with some battery or other arrangement, which is capable of communicating to them this difference of affinity, as in the case of the plates of a depositing vessel connected with a battery or with a magneto-electric machine. Thus, in the case of one metal in one liquid, as of iron in aqueous sulphate of copper, the iron has a stronger affinity for the sulphuric acid of the copper salt than the copper has; therefore it is dissolved and the copper deposited. But if it were copper in the same liquid no solution or deposition would occur, because the two metals being alike there is no difference in their strength of affinity for the acid. Or if it were a piece of platinum in the same liquid no action would take place, because the acid has a stronger affinity for copper than for platinum, and, therefore, would not leave the former to unite with the latter. Also in the case of two metals in one liquid, as zinc and tin in a solution of tin salt, the zinc having a stronger affinity for the acid element of the liquid than the tin has, it is dissolved and the tin deposited; but if it were two pieces of tin in the same liquid no action would take place, because the metals being all alike all their chemical affinities are equally strong. Or if it were two pieces of platinum, or pieces of platinum and tin in the same liquid no action would occur, because the acid of the tin salt has a stronger affinity for tin than for platinum. Also in the case of one metal in two liquids, as copper in dilute nitric acid and in aqueous sulphate of copper, the copper having a stronger affinity for the former liquid than for the latter, is dissolved in the former and deposited in the latter; but if it were platinum in the place of copper in the dilute acid, there would be no solution or deposition, because the strength of affinity between platinum and dilute nitric acid is not greater, but less than between copper and the sulphuric acid of the sulphate of copper, or if it were platinum in both cells, there would be no action from the same cause. Also in the case of two metals in two liquids, as of zinc in dilute hydrochloric acid, and copper in aqueous chloride of copper, the zinc having a stronger affinity for dilute hydrochloric acid than copper has for the other liquid, it is dissolved and copper deposited; but if it were platinum in the dilute acid, and zinc in aqueous chloride of zinc in the other division, there would be no deposit, because the affinity of the platinum for dilute hydrochloric acid is weaker than that of zinc for hydrochloric acid. Also in the case of two similar metals in a similar liquid, as of plates of copper in aqueous sulphate of copper in a depositing vessel, no action occurs, because there is no difference in strength of affinity between the two metal plates and the metal of the solution for the acid of the salt; but when by connexion with a battery or other

arrangement, as the magneto-electric machine, an artificial difference in the strength of affinity of the two metal plates for the elements of the metallic solution is set up, one plate dissolves, and the other receives a deposit of copper.

12. It is also necessary that the depositing liquid should contain elements possessing acid and basic properties, that the acid may combine with the dissolving metal, and the basic metallic element be deposited upon the receiving plate. Thus, if the depositing vessel contains a solution of a salt of mercury, and iron plates connected with a battery, the acid of the salt will combine with the dissolving metal, and the metal of the salt be deposited upon the receiving plate; but if the depositing vessel contains pure fluid mercury uncombined with any material of acid properties, no solution or deposition of the metal upon the iron plates will occur.

13. It is further necessary that the compound element or salt formed by the union of the acid and the dissolving metal be soluble in the liquid, otherwise deposition will sooner or later be stopped by the dissolving metal becoming coated with an insoluble coating, or by the liquid becoming exhausted of metal; thus if the depositing vessel contain copper-plates and hyposulphite of copper and soda dissolved in an aqueous solution of hyposulphite of soda, the dissolving plate will gradually become covered with a black insoluble salt of copper, and deposition of copper will cease; or if the vessel contain tin plates immersed in a cold solution of cyanide of copper in aqueous cyanide of potassium, the dissolving plate will combine with the cyanogen of the potassium, and form cyanide of tin, which being insoluble in the liquid, will fall to the bottom as a white powder, and the solution being gradually exhausted of its metal, deposition will cease; but if the vessel contain a solution of cyanide of silver in aqueous cyanide of potassium, and silver plates, the cyanide of silver formed being soluble in the liquid, will supply silver to the liquid as fast as it is deprived by deposition, and thus allow the process to continue.

14. It has been ascertained that in a compound arrangement of a series of liquids and metals, as in the combination of several batteries with a depositing vessel, an *uniform direction* of affinity is necessary to deposition, and that the elements possessed of strong and weak affinities must alternate in the series, every dissolving metal being connected with a receiving metal. Thus, if two Smee's batteries are connected with the plates of a depositing vessel, the order of connexion must be thus: receiving plate, zinc, silver, zinc, silver, dissolving plate; thus all the stronger affinities of the zinc plates lie in one direction, and the weaker affinities of the silvers in the opposite direction, and deposition takes place; but if the order was: receiving plate, zinc, silver, silver, zinc, dissolving plate, no deposition would occur, because the affinities are equally strong in each direction, and balance each other—further, if from any cause there exists a preponderance of strength of affinity in one direction, deposition to a greater or less extent will take place. Thus if three similar Smee's batteries are connected with a depositing vessel, and the zinc plates of two of them face in one direction, and the zinc plate of the other face in the opposite direction, the surplus strength of affinity of the two pairs over that of the one, will pass on and effect deposition, or if two single batteries of unequal strength, as a Grove's battery and a Smee's are opposed to each other, the same effect will take place, but if any number of batteries of equal strength of affinity are opposed to an equal number of similar batteries, and connected with a depositing vessel, no deposition will take place; thus, if six pairs of Smee's batteries are opposed to six pairs of the same kind, the sum of the total strength of affinities of each six being equal and opposed, they exactly balance and neutralize each other's effects. Thus we perceive that in every compound depositing arrangement, the sum of the strength of affinities of the dissolving metals must be greater than that of the receiving metals, in order to effect deposition.

15. In addition to those chemical conditions essential to deposition there are several electrical conditions equally necessary; viz., that the dissolving and receiving metals are electrically different or electro-polar to each other, and

that in every case the dissolving metal must be electro-positive to the receiving metal in their respective liquids. Thus in the case of one metal in one liquid, as iron immersed in aqueous sulphate of copper, iron is electro-positive to copper, as may be proved by connecting a wire of each metal with a galvanometer and immersing their free ends in that liquid, when the needles of the instrument will be deflected in that direction, which indicates the iron positive and the copper negative ; but if a platinum wire is immersed in aqueous sulphate of copper it receives no deposit of metal, and by testing its electrical relation to copper in that liquid by the galvanometer it will be found to be electro-negative and the copper positive : also in the case of two metals in one liquid, as zinc and tin in a solution of tin salt, zinc is electro-positive and tin negative, zinc is dissolved and tin deposited ; but if platinum and tin were used the tin would be positive and no deposit would take place : also in the case of one metal in two liquids, as copper in dilute nitric acid and in aqueous sulphate of copper, the former is positive and dissolves, and the latter is negative and receives deposit ; but if it were platinum in both cells there would be no solution or deposition, because the platinum in the dilute acid would not be electro-positive to that in the metallic solution : also in the case of two metals in two liquids, as zinc in dilute hydrochloric acid and copper in aqueous chloride of copper, the former is electro-positive and dissolves, and the latter negative and receives the deposit ; but if, in the place of the zinc we were to substitute a piece of platinum, or other metal having a weaker chemical affinity for hydrochloric acid than copper has for chlorine in aqueous chloride of copper, the copper would be positive and the platinum negative, and there would be no deposition of metal : also in the case of two similar metals in a similar liquid, as two plates of copper in aqueous sulphate of copper in a depositing vessel, whilst either of them is rendered electro-positive and the other electro-negative by connexion with a battery or other suitable arrangement, the positive plate dissolves and the negative one receives deposit ; but if they are not connected with such an arrangement, they will be found to be nearly or quite electrically neutral to each other, and no solution or deposition will take place.

16. It is also necessary that the depositing liquid should contain substances possessing electro-positive and electro-negative properties, that the electro-negative or acid element may combine with the electro-positive or dissolving plate, and the electro-positive or basic element, the metal, be deposited upon the electro-negative or receiving plate. Thus if the depositing vessel contains a solution of a salt of mercury and two platinum plates connected with a suitable battery, the electro-negative acid element of the metallic salt will combine with the electro-positive or dissolving plate, and the electro-positive or basic metallic element will be deposited upon the electro-negative or receiving plate ; but if fluid mercury were used in the place of the solution of a salt of mercury no solution or deposition would occur, because there is no electro-negative acid element to combine with the dissolving plate.

17. Further, in a compound arrangement of metals and liquids, as in the case of a series of batteries and depositing vessels connected together, it is necessary that the different electrical polarities alternate, and that the metals of different electrical qualities in accordance with their different strengths of chemical affinity alternate, and that the stronger affinities or electro-positive elements lie in one uniform direction. Thus in the case of two Daniells' batteries connected with a depositing vessel, the order of connexion must be : receiving metal, zinc, copper, zinc, copper, dissolving metal ; thus the two opposite electro-polar conditions, the positive zincs and the negative coppers, are arranged in opposite directions, and by connexion with the metal plates of the depositing vessel communicate their properties to them, and cause one to dissolve and the other to receive deposit ; but if the order of connexion was : receiving metal, zinc, copper, copper, zinc, dissolving metal, no action would occur, because the opposite affinities and corresponding electrical conditions would balance and neutralize each other instead of communicating their properties to the metal plates of the

depositing vessel; but if from any cause there exists a preponderance of affinity and of corresponding electro-polar tension in one direction, deposition to a greater or less extent will occur. Thus if three Daniells' batteries were used, two facing in one direction, and one in the opposite direction, the surplus electrical power or preponderance of electro-polar tension would pass on through the weaker battery and effect deposition in the depositing vessel; or if two batteries of unequal electrical intensity face each other and be connected with a depositing vessel, a similar result will be obtained—the stronger tension will overcome the weaker and effect deposition.

18. Another essential electrical condition is, that in every case all the wires, plates, and liquids used in the arrangement must be capable of conducting electricity, and that they must be so combined together as to form a complete circuit. Thus, if the combination consists entirely of metal wires, plates, and metallic solutions, and they be in perfect contact with each other, and form a complete circle or circuit, deposition will take place; but if it consists in any part of rods or plates of gutta percha, glass, or any other electrical nonconducting substance, or if we substitute oil or melted wax for either of the liquids, no conduction of electricity or deposition of metal will take place; or if the wires be cut off in any place, or one of the liquids removed, or by any other means the completeness of the conducting circuit be anywhere destroyed, all action will cease.

19. It appears likely, from the foregoing facts, and it has been fully proved by experiment, that in all cases of electro-deposition electrical forces are circulating through the liquids, metal wires, and plates of the apparatus, and that this circulation is essential to deposition. Thus if a galvanometer be inserted in any circuit in which deposition is occurring its needles will be deflected, indicating the passage of electric force; but if the circuit be any where broken the needles will immediately return to zero and all action will cease; and it matters not, as we have seen, whether the combination consists of one metal and one liquid; two metals and one liquid; one metal and two liquids; or two metals and two liquids; each with or without a depositing vessel; or of one or a series of such combinations; or of depositing vessels connected with one or a series of batteries, or with other instruments which act as such; deposition may be effected, provided all the arrangements are favourable to the free circulation of this force into and out of a metallic solution.

20. For the more clear understanding of the circuit and the circulation of the electric forces, the different parts of the circuit have received different names. Thus the liquids undergoing decomposition have been termed "electrolytes," from two Greek words, "electron," meaning "electric," and "luo," to "set free;" the metallic surfaces at which the electric forces enter and leave the liquid have been termed "electrodes," from two Greek words, "electron" and "odos," meaning "a way;" the elements of the liquid have been termed "ions," from a Greek word meaning "going," participle of "to go;" the metal surface at which the positive electricity enters the liquid, *i. e.* the dissolving or positive metal, has been termed the "anode," from two Greek words, "ana," meaning "upwards," and "odos," meaning "a way"—the way in which the sun rises; and the opposite receiving or negative plate at which the negative electricity enters the liquid has been termed the "cathode," from two Greek words, "cata," meaning "downwards," and "odos," "a way,"—the way in which the sun sets; and those acid or electro-negative elements of the liquid which combine with or are set free at the positive or dissolving plate have been termed "anions," because they appear at the "anode;" and those basic or electro-positive elements which are deposited or set free at the negative plate are called "cathions," from their being set free at the "cathode." Thus in the deposition of copper upon iron by immersing a piece of the latter in aqueous sulphate of copper, the solution forms the electrolyte, the iron the anode, the copper deposited upon the iron the cathode, the sulphuric acid of the salt the anoin, and the copper of the salt the cathion; also with zinc and tin in a solution of tin salt, the two metals are the electrodes, the liquid the electrolyte, the zinc is the anode,

the tin the cathode, the acid of the tin salt the anion, and its associated metal the cathion; also with copper in dilute nitric acid and in aqueous sulphate of copper, the liquids are the electrolytes, the metal surfaces the electrodes, the elements of the liquids the ions, the copper in the dilute acid the anode, that in the aqueous salt the cathode, the nitric acid the anion, and the copper of the salt the cathion.

21. In addition to the various chemical and electrical conditions mentioned as essential to deposition, there are, doubtless, other and more general changes and conditions of the various metals and liquids of a *thermic* character equally if not more necessary to this phenomenon; but what they are or what definition they may be included under has not yet been experimentally ascertained.

22. Passing on we may observe that there are certain dynamic conditions of the matter or "material substratum" nearly always present in actions of deposition; viz., that the aggregation of attraction of the atoms of the depositing metal is attended by the disintegration or repulsion and solution of the metallic atoms of the dissolving plate, and that these two opposite conditions of physical activity, attraction, and repulsion, alternate in the circuit. Thus with one metal and one liquid, as iron in aqueous sulphate of copper, the atoms of iron repel each other and are dissolved, whilst the atoms of copper attract each other and return to the solid state: also with two metals in one liquid, as zinc and tin in a solution of tin salt, there is a repulsion and solution of the atoms of zinc, and attraction and deposition of the atoms of tin to the solid state: also with one metal and two liquids, as copper in dilute nitric acid and in aqueous sulphate of copper, the atoms of the piece of copper in the dilute acid repel each other and dissolve, whilst those of the other liquid attract each other and are deposited: also with two metals and two liquids, as zinc in dilute hydrochloric acid, and copper in aqueous chloride of copper, the atoms of zinc are repelled and dissolved, whilst those of the copper are attracted and deposited: also when a battery or other suitable source of attractive and repulsive power is connected with a depositing vessel containing copper-plates in a solution of sulphate of copper, the atoms of the copper anode are repelled and dissolved to form cathions in the liquid, whilst the copper cathions already in the liquid are attracted and reduced to the solid state forming a cathode, thus forming a continuous series of repulsive actions.

23. It has been proved by very careful analyses of the results of electro-solution and deposition that this attraction and repulsion always takes place in certain mathematical proportions with the different kinds of matter used; viz., in their atomic weights, or the same proportions in which the same substances combine together chemically, and these proportions have received from this discovery the name of electro-chemical equivalents. Thus for every single atom or 32 parts zinc repelled or dissolved in any circuit there would be 1 atom 28 parts of iron, 1 atom or 31 parts of copper, 1 atom or 108 parts of silver, 1 atom or 199 parts of gold, &c. &c., attracted or deposited in any other part of the same circuit. Thus we arrive at the idea that the two forces of attraction and repulsion exist in equal degrees in an atom of each kind of matter, and that they exert themselves in equal measures in opposite directions in every electrical circuit.

24. We may now, by reasonable induction, obtain and pass on to the general exponent and abstract definition of all the foregoing phenomena; viz., that in all parts of the circuit there exists "an axis of forces" of attraction and repulsion, "equal in power, but contrary in direction;" that every attraction and deposition of metal from the liquid to the solid state, may alternate with an equivalent repulsion and solution of metal from the solid to the liquid state, and that these actions are effected by equivalent and opposite forces of attraction and repulsion; and that the sum of all the attractions in any circuit is an exact equivalent of the sum of all the repulsions in the same circuit.

25. In conclusion, we may observe that all these phenomena of electro-chemical attraction and repulsion are but one small term of a long series of actions which result from the exertion of cosmical forces in maintaining a state of balance in physical nature.

Birmingham, April, 1853.

ON THE MANUFACTURE OF AMMONIA AND AMMONIACAL SALTS.

During the last twenty-five years, the manufacture of liquid ammonia and of ammoniacal salts (more especially the sulphate of ammonia) has received considerable development, insomuch that in nearly all the principal towns of the kingdom manufactories of these articles are now to be met with. The development of this manufacture has arisen from the immense increase in the production of the raw ammonia furnished by the continued extension of gas-lighting, the low prices at which it is obtainable from this source rendering the application of liquid ammonia, and of ammoniacal salts, accessible to various useful purposes in the arts, manufactures, and agriculture, to which previously the cost of these articles formed an impediment. Liquid ammonia is usually obtained in the commercial scale by submitting a mixture of sulphate or muriate of ammonia and lime to the action of heat, in a closed iron pan or still; the ammonia passes off in the state of vapour, and is condensed by passing through water contained in a series of Woulfe's bottles, formed of lead or earthenware, whence the solutions of ammonia may be drawn off, of any required strength or density. The residuum in the still is either sulphate or muriate of lime, according to the salt employed.

Carbonate of ammonia is obtained by exposing a mixture of sulphate or muriate of lime to the action of heat enclosed in a retort; carbonate of ammonia and sulphate or muriate of lime are thus obtained; the former passes off into large leaden chambers, called balloons, where it is condensed in solid masses, whilst the latter remains as a residuum in the retort. The impure carbonate of ammonia thus obtained is then placed in iron pots, and heated, by which means the pure salt is volatilized and collected in suitable receiving or subliming vessels.

The sulphate and muriate of ammonia may be obtained by the action of sulphuric or muriatic acid on certain sulphates and muriates in the carbonate of ammonia contained in the ammoniacal waters of the gas-works or other sources, the sulphuretted hydrogen contained in these waters being got rid of by the assistance of the metallic oxides, &c. The solutions of these salts are then evaporated and crystallized. The sublimed muriate of ammonia (sal ammoniac) is obtained, either by heating the crystallized muriate or a mixture of sulphate of ammonia and common salt, or sulphate of ammonia and muriate of lime, in iron pots, and collecting the sublimed salt in suitable receivers, attached by means of luting to the subliming pots.

As the mode of manufacturing these articles vary according to particular circumstances, we shall proceed to mention the chief sources whence ammonia and its salts are obtainable, and describe some of the numerous processes which have of late years been devised for obtaining them in the commercial scale.

Ammonia from Soot.—The soot arising from burning the dung of camels and other animals appears to have been the original source of ammonia. Egypt formerly supplied large quantities of muriate of ammonia obtained from this source. Twenty-six pounds of soot are said to yield six pounds of sal-ammoniac. From coal soot also, a considerable quantity of ammonia, in the state of carbonate and sulphate, may be obtained, either by sublimation or lixiviation with water. It is chiefly on account of the ammonia contained in soot that this substance forms so valuable a manure.

Ammonia from Bones, &c.—The destructive distillation of bones for the purpose of obtaining animal charcoal, used as a decolourizing agent in the refining of sugar and various chemical salts, is a source of ammonia. For this purpose, the bones are carbonized in suitable sized retorts or pots, the products of distillation being water, carbonate of ammonia, the oil called Dippel's oil, and some incondensable gases. The following are the particulars relative to the products as manufactured (in France) on the large scale, of animal charcoal and ammoniacal salts:—Bones of various kinds, 46,754 tons; silk waste and old leather, 30 tons; sulphuric acid, 11½ tons; common salt, 80 tons, and plaster of Paris, 2¾ tons, were the raw materials employed. The products obtained therefrom, were 2,400 tons of animal charcoal, 44 tons of sal ammoniac, 100 tons of sulphate of soda, 4 tons of liquor ammonia, and 25 tons of sulphate of ammonia. The ammoniacal salts are obtained in this manufactory as follows:—

Sulphate of Ammonia.—The condensed liquors from the carbonization of the bones are separated into two distinct states, the oily and the aqueous products, the latter of these containing carbonate of ammonia, are treated with sulphate of lime, whence

result insoluble carbonate of lime and sulphate of ammonia in solution, which is evaporated and crystallized.

Muriate of Ammonia.—This salt is obtained by either of the three following methods :—1. By decomposing sulphate of ammonia by means of common salt. 2. By treating the crude carbonate of ammonia liquors obtained from the distillation of bones, with muriatic acid. 3. By decomposing the crude carbonate of ammonia liquors with muriate of manganese, the residuum obtained in the manufacture of chlorine. In either case, the solution of the salts obtained is evaporated and crystallized, and afterwards, if desired, sublimed. 204lbs. of bones being carbonized, yield a sufficient quantity of carbonate of ammonia to furnish from 102 to 122lbs. of sublimed sal-ammoniac.

Carbonate of Ammonia.—This salt is obtained by submitting a mixture of 65¼lbs. of sulphate of ammonia, and 99lbs. of carbonate of lime to distillation, whence is obtained about 41lbs. of crude carbonate of ammonia, which is afterwards refined.

Liquid Ammonia.—This is obtained by heating together in a suitable retort or vessel, 61¼lbs. of calcined sulphate of ammonia, and 61¼lbs. of slaked lime. The disengaged gas is collected by absorption in water contained in a series of Woulfe's apparatus, through which it is made to pass.

M. Leblanc, to whom we owe the process for obtaining soda from common salt, originated the following method of manufacturing muriate of ammonia. He employed two tight brick-kilns for this purpose, one of which he charged with sulphuric acid and common salt, and the other with animal matters. The muriatic acid gas evolved from the one kiln, and the ammonia evolved from the other, he caused to pass separately into a chamber lined with lead, containing a stratum of water on its bottom. The two gases here combined with the formation of sal-ammoniac.

Ammonia from Guano.—Mr. Young took out a patent, November 11th, 1841, in which he describes his method of obtaining ammonia from guano. He fills a retort, placed vertically, with a mixture of two parts by weight of guano, and one part by weight of hydrate of lime or other caustic alkali. These substances are thoroughly mixed by giving a rotary or reciprocating motion to the agitator placed in the retort, a moderate degree of heat is then applied, which is gradually increased until the bottom of the retort becomes red-hot. By this means the ammonia is set free, and the uric acid contained in the guano being decomposed, yields ammonia also. The ammoniacal gas thus given off is absorbed by water in a condenser, whilst other gases, which are given off at the same time, being insoluble in water, pass off. Solutions of carbonate, bicarbonate, or sesquicarbonate of ammonia are produced, by filling the condenser with a solution of ammonia, and passing carbonic acid through it. A solution of sulphate or muriate of ammonia is obtained by filling the condenser with diluted sulphuric or muriatic acid, and passing the ammonia through it as it issues from the retort.

Dr. Wilton Turner took out a patent, March 11, 1844, for obtaining salts of ammonia from guano. The following is his method of obtaining muriate of ammonia in conjunction with cyanogen compounds :—The guano is subjected to destructive distillation in close vessels, at a low red heat during the greater part of the operation ; but this temperature is increased towards the end. The products of distillation are collected in a series of Woulfe's bottles, by means of which the gases evolved during the operation may be made to pass two or three times through water, before escaping into the air. These products consist of carbonate of ammonia, hydrocyanic acid, and carburetted hydrogen, the first two of which are rapidly absorbed by the water, with the formation of a strong solution of hydrocyanate and carbonate of ammonia. After the ammoniacal solution has been removed from the Woulfe's apparatus, a solution of protomuriate of iron is added to it, in such quantities as will yield sufficient iron to convert the latter into Prussian blue, which is formed on the addition of muriatic acid in sufficient quantity to neutralize the free ammonia; the precipitate thus formed is now allowed to subside, and is carefully separated from the solution, and by being boiled with a solution of potash or soda, will yield the ferro-cyanate of the alkali, which is obtained by crystallizing in the usual way. The solution (after the removal of the precipitate) should be freed from any excess of iron it may contain, by the careful addition of a fresh portion of the ammoniacal liquor, by which means the oxide of iron will be precipitated, and a neutral solution of ammonia obtained. When the precipitated oxide and cyanide of iron have subsided, the solution of muriate of ammonia is

drawn off by a syphon, and the sal-ammoniac obtained from it by the usual processes; the oxide of iron is added to the ammoniacal solution next operated upon.

If sulphate of iron and sulphuric acid are used, sulphate of ammonia is the ammoniacal salt produced, the chemical changes and operations being similar to the above. In Doctor Wilton Turner's patent of December 24, 1846, he directs that the urate of ammonia contained in guano be converted into allantoin, oxalic acid and urea. The allantoin is capable of being decomposed into oxalic acid and ammonia, by being boiled with a solution of any caustic alkali or alkaline earth. The oxalic acid unites with the alkali used, whilst the ammonia passes over, and may be collected as liquor ammoniæ. Ammonia may also be obtained from the urea above mentioned, by boiling it in a still with milk of lime, when it is decomposed into carbonic acid, which unites with the lime, and ammonia which passes into the receiver.

In the specification of his patent of August 11, 1846, Mr. Hills describes his mode of obtaining sesquicarbonate of ammonia from guano. To effect this, the guano is first mixed with charcoal or powdered coke, the mixture is then heated, and the sesquicarbonate of ammonia obtained by sublimation.

Ammonia from Urine.—Stale urine is also a source of ammonia. The urea of the urine undergoes decomposition, with the formation of ammonia. By the addition of sulphuric or muriatic acid, sulphate or muriate of ammonia may be obtained. It is on account of the ammonia contained in stale urine, that this substance is employed in the scouring of wool and woollen cloth.

Ammonia from Peat.—Mr. Hills, in his patent of August 11th, 1846, specified the following method of obtaining ammonia from peat. The peat is placed in an upright furnace and ignited; the air passes through the bars as usual, and the ammonia is collected by passing the products of combustion through a suitable arrangement of apparatus to effect its condensation. This plan of obtaining ammonia from peat appears to be precisely similar to that patented by Mr. Rees Reece (January 23rd, 1849), and made to form an important feature in the operations of the British and Irish Peat Company. The first part of Mr. Reece's patent is for an invention for causing peat to be burned in a furnace by the aid of a blast, so as to obtain inflammable gases and tarry and other products from peat. For this purpose, a blast furnace, with suitable condensing apparatus, is used. The gases, on their exit from the condensing apparatus, may be collected for use as fuel or otherwise; and the tarry and other products pass into a suitable receiver. The tarry products may be employed to obtain paraffine and oils for lubricating machinery, &c., and the other products may be made available for evolving ammonia, wood spirit, and other matters by any of the existing processes. On the 27th of July, 1849, a statement was made in the House of Commons to the effect that 100 tons of peat would produce 2,602 lbs. of carbonate of ammonia, of the value of £32 10*s.* 2*d.*, and other products of the value of £59 6*s.* 6*d.*; the peat costing £8, and the labour of converting it into these valuable products £8 more. An amended statement afterwards appeared in the Company's prospectus, from which it appeared that 36,500 tons of peat were capable of yielding sufficient ammonia to furnish, with the aid of the requisite quantity of sulphuric acid, 365 tons of sulphate of ammonia. Dr. Hodges, of Belfast, states that in his experiments he obtained nearly $22\frac{3}{4}$ lbs. of sulphate of ammonia from a ton of peat. Sir Robert Kane, who was employed by Government to institute a series of experimental researches on the products obtainable from peat, states that he obtained sulphate of ammonia at the rate of $24\frac{8}{10}$ lb. per ton of peat. Messrs. Drew and Stocken patented in 1846, the obtaining ammonia from peat by distillation in close vessels, as practised in the carbonization of wood. It will thus be seen that peat is a source of ammonia, but that this source is a profitable or economical one in a commercial point of view, we believe has yet to be determined.

Ammonia from Schist.—Another source of ammonia is bituminous schist, which, when submitted to destructive distillation, gives off an ammoniacal liquor, which may be employed in the manufacture of ammoniacal salts by any of the usual processes. The obtaining ammonia from schist forms part of a patent granted to Count de Hompesch, September 4, 1841.

(*To be continued.*)

ON THE POWER OF SOILS TO ABSORB MANURE.

BY J. THOMAS WAY, ESQ.,
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(*Concluded from page* 545.)

Referring to what has been stated, it will be seen that all the silicates, without exception, are capable of absorbing ammonia. This is very important, inasmuch as it exhibits so very certain a provision for the retention of ammonia in soils. It matters not whether one or more of these compounds is present in a soil, so that any one of them is there; the ammonia added in manure, or derived from the atmosphere, will equally be retained. Indeed, this list of the order of these decompositions strikes me as of singular interest, indicating the care and solicitude of nature in the preservation of the different substances which are essential to the growth of plants, in direct relation, as far as we have been able to learn, to their relative importance. Ammonia, for instance, may well be considered as of the very first consequence to vegetation, and, for its retention, four other alkaline bases are made responsible. Next comes potash, which is also of very great agricultural importance; whilst, at the other end of the list, we have soda, for the retention of which no provision is made, and which is liable to be displaced by salts of all the other bases. Now, it so happens that almost all those Chemists who have been much engaged in the examination of the ashes of plants have come to the conclusion that soda is not necessary to vegetation—that is to say, not as a constituent of plants. In the seeds, which are the only perfected parts of plants, soda rarely exists, except in insignificant quantity, and then only as common salt, present, probably, from want of perfect maturity of the seed. In the succulent parts of plants, it is true, soda is found in quantity, but in all probability it only there exists as a part of the unelaborated juice of the plant, and in virtue of the great quantity of water contained in it. It is most interesting, therefore, that not only is there an absence of retentive power for this alkali, but it is also made subservient to the preservation of all those that are of importance.

Lime, which stands next on the list, is again less cared for than potash or ammonia, probably because its abundance in nature is generally a sufficient security.

It is necessary to state, in reference to these decompositions, that the rule laid down only applies to the action of the *salts* of different bases on the silicates. Thus, as has been said, sulphate of lime cannot cause the displacement of ammonia from its silicate; but, on the other hand, the action of the caustic alkali lime itself would be very different, for not only would silicate of ammonia be decomposed by lime, but the potash of silicate of potash and alumina would also be displaced by it.

This point is of great importance, because it is quite possible that the evils of *over-liming* of land may be due to the driving off the ammonia of the soil, which constitutes, so to speak, its capital; and what may be only a useful application of lime to one soil may be destructive to another; because, from the smaller proportion of other silicates for the lime to act upon and become absorbed in, it may attack the ammoniacal compound, and, by driving away the ammonia, impoverish the land.

The action of heat on these silicates is peculiar. It has been before stated, that they contain water of combination, which is driven off at a red heat, but after being strongly heated they lose their property of acting on different salts. For instance, the double silicate of soda, after being heated to redness, no longer absorbs ammonia, or is decomposed by salts of potash.

This is the reason why felspar and albite, substances of the same composition in all other respects as the artificial silicates, are devoid of the power of absorbing ammonia. It is only in the state of hydrates that the double silicates possess the property in question; and this, again, accounts for the fact which was observed, that the retentive power of clay and soils in general for ammonia was very much diminished, and in some cases entirely destroyed, after the soils had been heated to redness.

We have here a further proof of the identity of these double silicates, artificially produced, with the substances in the soil, which give it the power of absorbing the salts of manure.

I do not think, indeed, that this point admits of much dispute. We find that a power is possessed by soils which is not referable to the organic matter, the sand, or

carbonate of lime which they contain; and further, that pure clays, free from any of the ordinary salts of lime or soda, possess this property in a high degree. Believing that the activity of clay can only be due to some compounds of silica, we are led to examine some of these compounds anew; and whilst it is ascertained that the ordinary simple silicates are not the salts we are in search of, and that the natural double silicates of the type of the felspars, which are likely to exist in clay, are equally devoid of the requisite properties, a new class of substances is discovered, having, though in a far higher degree, all the qualities of the clay itself. It seems that this is, on the whole, as conclusive as any evidence of the kind could be; and we may hereafter, with advantage, employ our knowledge of these double silicates in elucidation of some of the questions of practical manuring.

It being, therefore, proved that the ammonia, potash, and other alkaline ingredients of manure, are under the influence of the soil separated from solution, and converted into double silicates, the question arises, how do plants ultimately obtain their mineral food from the soil? If the compounds so produced are insoluble in water, how is the ammonia or the potash liberated for the purposes of vegetation? The answer to these questions is, that the double silicates are *not* altogether insoluble in water. It is true, indeed, that in my account of the early experiments on the filtrations through soils, I stated that ammonia was entirely removed from solution by this operation, and I might be pardoned for making such a statement, inasmuch as the quantity that escapes is really so minute that it requires the greatest attention to make it evident at all, and practically it is quite correct to say that all the ammonia is retained. But still it is all-important to the other part of the question—that is to say, to the explanation of the subsequent use of the ammonia by plants—to ascertain whether or not these compounds are at all soluble. The double silicate of alumina and ammonia, when treated with distilled water, gives to it ammonia in very small quantity. It has already been shown that a gallon of water dissolves from this salt about one grain of ammonia, or one part in 70,000; and, small as this solubility is, there is every reason to believe that, with the large quantity of water circulating through a plant in the duration of its life, there would be sufficient ammonia thus introduced to supply all the nitrogen required for its albuminous constituents. But it has been found that carbonic acid water dissolves ammonia from the double silicate in considerably larger quantity. Thus, 1000 grains of water saturated with carbonic acid digested on the double silicate, dissolved out 0.0366 grains of ammonia; and, at the same rate, an imperial gallon would dissolve 2.527 grains. As water, then, naturally always contains this gas, it follows that the solubility of the ammonia will, in practice, be considerably greater than that given for distilled water. Again, it so happens that the double silicate is still more soluble in a solution of common salt. Thus, 1000 grains of a solution of common salt containing 1.97 per cent. of salt was found to dissolve 0.33 grains of ammonia, or at the rate of 23.1 grains in the gallon, which is twenty times as much as with pure water. And in a second experiment, where the solution of common salt was of different strength, or 0.1 per cent. of salt, the quantity of ammonia dissolved was 0.047, or 3.32 grains to the gallon. It is probable that many other salts, such as the sulphate of soda, for instance, would possess the same solvent power, and this influence cannot fail to be brought into play, because, wherever a salt of ammonia is arrested by the double silicate of soda or other compounds of the class, a corresponding alkaline salt is formed, which acts upon the newly-produced ammoniacal silicate. So that either by solubility in carbonic acid water, or in the various salts which are produced in the soil, it is easy to see that the ammonia may be dissolved in quantity sufficient for all the purposes of vegetation. In passing, it may be well to suggest that this extra solubility of these silicious compounds in carbonic acid, may in part explain the action of carbonaceous matters in the soil. Independently of being a real food of plants, by the carbonic acid which they furnish on decomposition, they would also indirectly increase the supply, not only of ammonia, but of all the other alkaline substances which are bound up in the form of silicates of small solubility.

Again, the influence of common salt, when used as manure, may depend on a like cause—an explanation which is the more probable, since we have reason, as before said, to doubt the value of soda as an element of the food of plants. And this leads me to mention, very shortly, a conjecture which I have been led to make with

regard to the deposition of silica in the straw of wheat and other crops of the same kind.

It has always been a matter of question with Chemists, in what way the beautiful coating of silica could be laid on wheat straw; and as the soluble compounds of silica hitherto known have been those of potash and soda only, it has been necessary to suppose that solutions of these salts were decomposed by carbonic acid, and that the silica, in solution in water, was subsequently carried to the straw and there deposited. The discovery of the silicate of ammonia, however, affords a much more satisfactory explanation of this phenomenon. When the double silicate of ammonia and alumina is treated with water, silicate of ammonia dissolves, and this solution, when carefully evaporated, leaves on the dish in which the operation is performed a transparent varnish of silica, hard and brittle, and splitting into thin plates like mica. In the act of evaporation the water carries with it the ammonia, leaving only silica behind. What more natural than to suppose that the silica of cereal crops is thus left by the constant transpiration of water from the surface of their leaves and stalks? A circumstance which in an interesting way favours the view now suggested, is, the observation made by Mr. Lawes that, in the growth of wheat, much more ammonia is removed from the soil than is found in the crop in the shape of albuminous matters; that, indeed, to produce one bushel of wheat, containing in round numbers 1lb. of nitrogen, between 4 and 5lbs. of nitrogen as ammonia are required in the soil. This singular observation, which has been hitherto without explanation, becomes intelligible enough if it be conceded that the ammonia is engaged in carrying the silica to the straw, and is, if we may so say, wasted in the act. It is also remarkable that this loss of ammonia is apparently confined to the cereal crops and grasses, and is not found to occur in plants that have not silicious stems. I do not wish to push this conjecture beyond its proper limits, and therefore merely mention it as worthy of being borne in mind. If it be in any degree correct, then the action of common salt in strengthening and brightening the straw of wheat and barley, which is the best ascertained of its effects as manure, is immediately traceable to the greater solubility of the silicate of ammonia in a saline solution.

Hitherto we have spoken only of the power of the double silicates to unite with ammonia, and separate it from *solution*. More important, if possible, is the faculty which some of these salts possess, of abstracting ammonia from the *air*. It has long been known that soils acquire fertility by exposure to the influences of the atmosphere—hence one of the uses of fallows. It has also been generally understood that clay possessed a power of absorbing ammonia from the air, but only through the influence of rain or dews, to bring down the volatile carbonate. This latter condition, however, is not at all necessary. I find that clay is so greedy of ammonia, that if air charged with carbonate of ammonia, so as to be highly pungent, is passed through a tube filled with small fragments of dry clay, every particle of the gas is arrested. In the same way, if into a bottle filled with air similarly impregnated, a little ordinary dry soil is thrown, and the bottle is then shaken once or twice, all ammoniacal smell is destroyed. The double silicate of alumina and lime is in these cases also the cause of the absorption. If, instead of clay, sand be placed in the tube, no obstacle is presented to the passage of the gas, but by mixing with the sand a few grains of the lime silicate we can immediately arrest it. The avidity of this silicate of lime and alumina for carbonate of ammonia is most marked. A few grains of the salt were spread upon a piece of paper, and covered with a glass bell jar, some fragments of dry carbonate of ammonia in a small dish being also covered by the jar; in a few hours the silicate was found to have absorbed between two and three per cent. of ammonia, and the action will go on until the salt is entirely saturated. The chemical change in this case is very simple—the carbonic acid of the carbonate of ammonia attacks the lime, forming carbonate of lime, whilst at the same time the double silicate of alumina and ammonia is produced. It is remarkable that the corresponding soda silicate does not absorb carbonate of ammonia, or, at all events, if it does so in an atmosphere highly impregnated with the volatile alkali, it gives it off again so soon as it is exposed to the air; in ordinary circumstances, therefore, it does not absorb ammonia from the air.*

* This circumstance, which was not anticipated, is, however, of easy explanation. When the lime silicate absorbs carbonate of ammonia, carbonate of lime is formed, and this, being insoluble, does not re-act upon the silicate of ammonia; but, in the other case, carbonate of soda would be one of the products; being a soluble salt, it is enabled to re-act by degrees on the ammonia

The power of the double silicate of alumina and lime to absorb carbonate of ammonia from the air is very important in reference to several practical questions in agriculture. The most important of these are the differences in natural fertility of different soils, and the power of conferring increased fertility on land by abundant cultivation. It is not my wish to assert that the dissimilarity in soils in regard to natural capacity of producing crops can be accounted for by reference to any one circumstance; on the contrary, it is certain that very many circumstances may combine to give a superiority to one soil over another; but it is also certain that one soil will be highly enriched by a fallow which will in no degree benefit another. We know that ammonia exists in the air, in small quantity indeed, but when taken as a whole in abundance, materially to affect the growth of plants; now we have seen that silicate of alumina and lime, which exists in soils and which is an ingredient of clay, has the property of abstracting carbonate of ammonia from the air, and retaining it for the purposes of vegetation. As there is good reason to believe that different soils may contain unlike quantities of this double silicate, so they will, other things being the same, possess unlike degrees of natural fertility. In this circumstance we may probably find an explanation of the singular fertility of some soils, of which it is recorded that they have been cropped year after year with wheat, for a very extended period, without any apparent diminution in their power of yielding it. Upon examination, nothing extraordinary has been found in the composition of such soils to account for such a degree of fertility; but it is extremely likely that a further inquiry, with the aid of the light now thrown upon the subject, will show that the superiority of such soils is dependent upon their possession of a greater power of acquiring manure from the air by the means now pointed out. The second practical question to which I have referred, namely, the power of conferring increased fertility by abundant cultivation, is one that might profitably engage a very large share of our attention; but I can only in this place glance very slightly at the connexion between it and the discovery which it is the object of this paper to record. It is now more than a century ago that Jethro Tull published his work on agriculture—a work which contains doctrines so opposed to all the preconceived ideas and established practices of the farmer, that it is to this day looked upon by many an intelligent man as a mere collection of absurd theories: and yet I do not hesitate to say that, making allowances for the imperfect knowledge of the sciences of chemistry and botany of that period, Tull's views were those of a deeply observant and philosophical mind. Tull advocated the constant subdivision of the soil by abundant cultivation at all possible seasons; and the arguments by which he supported this practice were principally two. The first, which it is merely necessary to mention, was that by the breaking up and subdivision of the particles of soil, a new and constantly increasing food-yielding surface, or as he himself called it, "pasture," was provided for the roots of plants.

The second argument was, that by the continual opening and loosening of the soil opportunity was given to the air to enter it, and to confer upon it increased fertility. Tull knew not of what nature those atmospheric influences were, for at that time the names of ammonia and carbonic acid were unknown; but he was nevertheless convinced that the air did exercise some beneficial influence on the soil, and his aim was to court its entrance to the fullest extent.

Of the system which Tull invented to enable him to carry out his peculiar views, it is not my intention to speak. From time to time that system, more or less modified to adapt it to particular circumstances, has been revived by thinking, intelligent men; and at the present time a good deal of attention has been attracted to the novel method of wheat growing practised by the Rev. Mr Smith, at Lois Weedon, in Northamptonshire. Accounts of this system have appeared in a late number of this Journal and elsewhere; and as I have no intention of advocating any system, but simply of examining a principle by the application of the rule and square of scientific truth, I shall merely say that Mr. Smith believes with his great predecessor, Jethro Tull, that on fair average wheat-soils deep and abundant cultivation may more than replace manure. I said before that Mr. Smith has published his

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silicate, which is also slightly soluble, and carbonate of ammonia is the result. In point of fact, it is found that, when the double silicate of alumina and ammonia is mixed with carbonate of *soda*, fumes of carbonate of ammonia at once come off; whereas carbonate of *lime* has no such action on the ammonia silicate.

own account of his experiments and his views on the subject; they go much further than the bare question above propounded, but this is the question to which I limit my present inquiry, namely, Is it likely, on theoretical considerations, that the air and the soil together can by any means be made to yield without the application of manure, and year after year continuously, a crop of wheat of from thirty to thirty-five bushels per acre? I confess that I do not see why they should not do so.

We have seen the power which soils possess of abstracting ammonia from the air—this power is not confined to periods of rain, it is not even limited to the periodical recurrence of dew—so often as air charged with carbonate of ammonia comes into contact with a surface of soil, so often will that soil be enriched by ammonia to the extent to which the air contains it. It is impossible to state numerically the amount of ammoniacal manuring which a soil properly prepared might, in twenty-four hours, or in the course of the year, thus receive, simply because the necessary data are wanting, and we can only therefore judge by results. Fresenius found that 1,000,000 parts of air contained on the average of forty days and nights 0.379 parts of carbonate of ammonia, or 0.133 parts of ammonia itself; and although this proportion is very small, yet inasmuch as every time the air is renewed in the porous soil, the whole of the ammonia is removed; and as in a highly-worked soil one-third or one-half of the 1000 tons, of which an acre one foot deep consists, may be supposed to be ever on the watch for this prize, it is quite conceivable that the balance between the supply and that required by the crop may be in favour of the former; but this result can only be hoped for when the soil is brought into and kept in a continual state of subdivision and porosity so as to offer the freest welcome to the enriching air, and this it is the object of the Tullian system, as practised by Mr. Smith, to effect. Then, again, with ammonia comes carbonic acid, and as this gas constitutes one part in 1000 of air, it will be supplied in quantity nearly 10,000 fold more than the ammonia; I do not, therefore, see why, between the absorption of carbonic acid by the leaves and its supply to the roots in a porous soil, sufficient carbon should not be derived from the atmosphere for all the wants of a growing crop of wheat. But here again we can only conjecture—it is impossible to say positively, on theoretical grounds, that such *would* be the case, but on the other hand it is equally impossible to deny that it *might* be.

With regard to the mineral matters required by a crop of wheat, the inquiry is far more simple. We know very accurately how much the different parts of plants remove from the soil of potash, magnesia, phosphoric acid, &c.; and we know that if they are not added in manure they must be derived from the internal resources of the soil itself—for the air will do nothing here. We further know, from the analyses of soils that have been made, what amount of these substances are usually to be met with in the land.

Now, although it has been a constant axiom in the instructions of Chemists to farmers to " return to the soil what the crops remove"—and every candid agricultural Chemist will own, that at the outset of his career he has somewhat overrated the importance of literally fulfilling this obligation—it is certain that most soils of fair quality contain an amount of the different mineral substances far greater than is necessary for many successive crops of the most impoverishing character.

	One Crop.	Twenty Crops.	*Per Centage of the Soil removed by Twenty Crops.
	lbs.	lbs.	
Silica	170	3400	0.152
Phosphoric Acid	30	600	0.027
Sulphuric Acid...	8	160	0.007
Lime	16	320	0.014
Magnesia	10	200	0.009
Potash	40	800	0.036
Soda	3	60	0.003
	277	5540	0.248

In the preceding table I have given the quantities in pounds of the different mineral substances required by a crop of wheat of thirty-five bushels of grain and

* Calculated on a soil ten inches in depth, and weighing 1000 tons to the acre.

two tons of straw and chaff; a second column of the table shows the amount removed by twenty such crops; and in a third will be found the *per centage* of each which a soil must contain to furnish this last quantity.

Now it is common and usual to find from one-tenth to two-tenths per cent. of potash in ordinary soils, a quantity several times greater than is here shown to be necessary for twenty crops of wheat; and I would ask any Chemist acquainted with the analysis of soils, whether he has ever met with a soil which repays cultivation, which had not very much more of all these mineral ingredients than that given in the last column. The fact is, that there is an almost unlimited supply of the mineral requisites of plants in soils, but that the great agricultural problem is to get at them—to render them available; and here again it seems reasonable to suppose that abundant cultivation, which lets in carbonic acid and ammonia to the soil, may by that very act be providing the potash and phosphate of lime which the former, and the silica which the latter, are endowed with the power of dissolving, and presenting to the roots of plants.

But it is plain that there is a limit to all this; and whilst I cannot see why a considerable number of successive crops of wheat might not, by virtue of the manure-collecting and manure-preparing process of abundant cultivation, be raised from land without the direct application of manure, I am decidedly opposed to the principle of continuing this system on the same land for an *unlimited* number of years. The capabilities of the soil, great as they might be, must in that case gradually be diminished, and ultimately fail altogether; besides, such a plan would be unnecessarily hazardous. What is to prevent land that has been cropped successively with wheat on this plan for ten or fifteen years, supposing it has been found to answer for that period, from being changed for other land which has not been exposed to that drain?

With one or two more remarks, I will take leave of this subject for the present. We have seen that whenever a salt of ammonia or of potash reaches the soil, and gets distributed through it, a change occurs—a double silicate of alumina and ammonia or potash is formed, and the salt which was added no longer exists there. The ammonia or potash henceforth exists in the soil only in the form of silicate, and is presented to the roots of a plant only in that form, or in the form of carbonate, derived from it by the action of carbonic acid in the soil. And inasmuch as all average soils possess this property of conversion in more than the degree necessary for the quantity of manure which reaches them, the inference is obvious and incontestable, that nature has given to the soil this power for the specific purpose of preparing the food of plants, and we then have the soil occupying a place intermediate between that of mere dead matter and the living organism of plants. Further, if the combinations of these two, so to speak, innocent and mild acids, the carbonic and silicic, are the only ones appointed by nature, it follows that the salts of mineral acids, the sulphates and muriates, are not suited, indeed positively injurious to vegetation. This may account for the unhealthy grossness of wheat fed with crude ammoniacal salts, which have reached its roots without sufficient incorporation with the soil, whilst wheat grown after the Tullian system seems never to become over luxuriant, for in the latter case, as the ammonia is only obtained by virtue of the power of the soil to abstract it from the air, so it can never exist in it in any other than the form in which it is best suited for the wants of the crop. And this leads me, in conclusion, to remark that it is quite possible that light soils, which, from their want of power of preparing the manure, cannot safely be manured with guano or ammoniacal salts for the wheat crop, might perhaps benefit largely by the use of these double silicates—that an ammoniacal double silicate being the ready formed food of the cereals, might be an admissible source of ammonia when neither guano nor any other source of ammonia could be used. Whether the compounds now described could be produced at a sufficiently cheap rate for any practical application, I cannot at present state; but if so, I think it very probable that they might be of great service in practical agriculture; and owing to the property of solidifying ammonia possessed by some of them, they might be made the means of obtaining this valuable alkali from sources which are not at present available.

I am still engaged in following up the bearings of this highly interesting subject, and shall hope at a future time to have further important results to bring before the attention of the members of this Society.—*Journal of the Royal Agricultural Society of England.*

ON HYDRATE OF MAGNESIA AND HYDRATED OXIDE OF IRON AS ANTIDOTES FOR POISONING WITH ARSENIC.

BY M. SCHROFF.

It is known that M. Bussy proposed the employment of hydrate of magnesia as an antidote in cases of poisoning with arsenious acid. In order to test the efficacy of the proposed antidote, and to compare its action with that of hydrated oxide of iron, M. Schroff undertook a series of experiments, of which the following are the results:

He selected rabbits as the animals on which to make his experiments, as they do not possess the power of vomiting, and the results were not therefore likely to be influenced by such cause. Before making the experiments the animals were kept without food for sixteen or eighteen hours. The poison and the antidote were injected directly into the stomach by means of a small syringe with an elastic tube. After the injection the animal was again kept without food for five or eight hours in a cage, so constructed, that the urine which might be voided was collected, and this was submitted to a careful chemical and microscopic examination.

The chemical analysis of the matters examined for arsenic was made according to the method of M. Schneider. This method is founded on the transformation of arsenious acid into chloride of arsenic. The organic substances suspected to contain arsenic are put into a tubulated retort, and common salt, equal in weight to the substance operated upon, is added to it. A tubulated and quilled receiver is fitted to the retort, a small bottle being attached to the quill, so as to collect any liquor that may condense in the receiver, and a tube bent twice at right angles being fixed to the tubule from above and terminating in a vessel half filled with water. Pure concentrated sulphuric acid is now poured into the retort through a safety tube, and after the reaction has continued for some time in the cold, the retort is gently heated. The nascent hydrochloric acid converts the arsenious acid into volatile chloride of arsenic, which distils over with the aqueous vapour and excess of hydrochloric acid gas. Most of the chloride of arsenic will condense in the receiver as a heavy liquid, but a portion of it will pass on with the hydrochloric acid gas and be collected in the vessel containing the water. The distillation is to be continued until what passes over ceases to give a yellow precipitate with sulphuretted hydrogen. If the collected liquors do not contain sufficient arsenic to give a precipitate with sulphuretted hydrogen, they may still be tried for arsenic by Marsh's apparatus.*

It was ascertained by some preliminary experiments, that 0.05 of a gramme of arsenious acid, rubbed to powder, mixed with five grammes of water, and injected into the stomach, killed a rabbit in two or three days; and that 0.15 of a gramme caused death in about four hours.

In order to test the effect of magnesia as an antidote, a gramme of it was added to 0.05 of a gramme of arsenious acid mixed with water, and administered to a rabbit. In another case the arsenious acid was first administered by itself and the magnesia about an hour afterwards. Neither of the animals died, but they both manifested symptoms of poisoning, which did not entirely disappear for about eight days, and the presence of arsenic was detected in the urine.

Magnesia is not, therefore, strictly speaking, an antidote, but it is capable of greatly mitigating the poisonous effects of arsenic.

The results obtained with hydrated oxide of iron were less satisfactory than those with magnesia. A rabbit to which 0.05 gramme of arsenious acid, with 1.35 gramme of hydrated oxide of iron, was administered, died at the end of six days. Another to which the arsenious acid was given alone, and the oxide of iron about an hour afterwards, died the following day.

The author draws the following conclusions from the results of his experiments:—

Hydrate of magnesia and hydrated oxide of iron are both capable, to a certain extent, of mitigating the poisonous effects of arsenious acid, and hydrate of magnesia is certainly the most efficacious of the two. Hydrate of magnesia, being more

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* In delicate investigations the author recommends that the contents of the retort, as well as the distilled liquor, should be tested by Marsh's apparatus, in which case the liquid from the retort should be first treated with chlorate of potash, in the usual way, so as to decompose the organic matter.

finely divided and lighter than hydrated oxide of iron, does not promote alvine dejections so much.

Arsenite of potash causes death more quickly, and in smaller doses, than arsenious acid, and the poisonous effects of this salt are neither neutralized, nor even mitigated by acetate of magnesia or acetate of peroxide of iron, but on the other hand the fatal result is expedited.—*Journal de Pharmacie.*

HYDRATE OF MAGNESIA AS AN ANTIDOTE IN POISONING.

Schuchardt represents as the result of his experiments that hydrate of magnesia is a certain antidote, not only for arsenious acid, either in solution or substance, but also for corrosive sublimate, for the salts of copper, and even, although in this respect the experiments are not so satisfactory, for the alkaloids, such as morphia and brucia. The hydrate of magnesia may be prepared by mixing slightly calcined magnesia with water. In poisoning with arsenious acid the quantity of magnesia given as an antidote should exceed eight times the weight of the poison. For corrosive sublimate the antidote need not exceed five times the weight of the poison.—*Journal de Pharmacie d'Anvers.*

NEW METHOD OF DETECTING THE PRESENCE OF ORGANIC POISONS.

BY CH. FLANDIN.

The method proposed by the author is based upon the following principles, more fully developed by him in his *Traité des Poisons* :

1. Poisons are non-assimilable.
2. They pass into the organism by absorption.
3. Their action is one of contact.

In accordance with these principles all poisons should be recognizable unaltered in the organs with which they have been brought into contact, or to which they have been conveyed by absorption.

With regard to inorganic poisons the above proposition may be regarded as proved. With regard to organic poisons, the processes for the detection of which in toxicological cases are still very imperfect, the author assumes that in such cases it is necessary to separate them from:—1. Protein substances. 2. Colouring matters. 3. Fats. Substances belonging to the first class are coagulable at a temperature of 212° Fah., which does not cause any alteration in most of the organic poisons. Substances of the second are for the most part considerably altered by acids and bases. Those of the third class may be removed by alcohol or ether.

The author proceeds by mixing the substance to be examined with twelve per cent. of anhydrous lime or baryta, drying the whole at 212° Fah., and then reducing it to a very fine powder, which is extracted with boiling alcohol and filtered. The filtrate is almost colourless, and contains besides the substances sought for only fats and resinous substances. The alcohol is then separated by evaporation and the dry residue extracted with ether. If the poison sought for is insoluble in ether—morphine, strychnine, brucine—it can be separated from the liquid by filtration. If soluble in ether it must be separated from the residues left on evaporating the above alcoholic or etherial extracts by treating them with some special solvent—acetic acid, for instance—and then precipitated by ammonia.

The author has submitted this process to a series of synthetical trials. From one-half a grain to one grain of morphine, strychnine, or brucine, mixed with 100 grains of animal matter were again obtained in quantities that could be weighed. The alkaloids were obtained from mixtures of animal matter with opium, laudanum, decoction of nux vomica, and false angustura bark.

He likewise succeeded by means of this process in obtaining these poisons from the stomachs and intestines of poisoned animals, even from the organs to which they had been conveyed by absorption, and from a piece of flesh which had been putrifying for two months in contact with a minute quantity of morphine.—*Comptes Rendus*, March, 1853.

POISONING BY STRYCHNIA.

The following case, which recently occurred in the neighbourhood of London, shows the importance of caution in the mode of ordering strong medicines in prescriptions, and also the necessity of an attention to the dose in dispensing. It is not necessary to mention the names of the parties concerned. The prescription was as follows :—

℞ Strychnos
Nucis Vomici, ℈ij.
Bismuth Trisnit., ʒiss.
M. ft. pulv. xxiv.

The prescription was prepared twice or three times at different shops correctly, and produced no bad effect; but on one occasion the young man put in strychnia and nux vomica, *of each* ℈ij. The patient took one dose, and very soon afterwards complained of some extraordinary sensations, and almost immediately expired. The accident arose from the fact that the word *strychnos* being written on a separate line, was considered by the dispenser to be another ingredient, instead of being as it was, the generic title of nux vomica. This would not have misled a young man qualified for his business, who considered for a moment the strength of the dose he was administering, but all young men not being so qualified and considerate, care should be taken in writing prescriptions to avoid any possible ambiguity.

EMPLASTRUM EXTRACTI ACONITI RADICIS.

BY WILLIAM PROCTER, JUN.

Having been requested by Dr. Francis Gurney Smith to prepare a plaster medicated with *aconitia*, the following formula was suggested by me as being less expensive than one requiring the pure alkaloid, yet possessed of equal, if not superior efficiency, because the greater bulk of the extract would prevent the plaster from masking the power of the active ingredient, and its ready solubility be more favourable to the influence of the remedy.

Take of Aconite root, in coarse powder, four ounces.
" Alcohol, sp. gr. 835, a sufficient quantity.
" Adhesive plaster, three ounces and a half.

Moisten the powdered aconite root with six ounces of alcohol, and permit it to macerate twenty-four hours, then put it in a small displacer, and when properly packed, pour on gradually sufficient alcohol to make a pint of tincture. Distil off three-fourths of the alcohol, evaporate the residue on a water-bath to a thick syrupy consistence, then add the plaster previously liquefied, and stir constantly, until it is properly incorporated with the soft resinous extract, and allow it to cool. The resulting aconite plaster has a brown colour, and homogeneous consistence, and weighs about four ounces troy. This plaster should be spread in a thin stratum on skin or oiled silk, and may be used several times when its application has not been too long continued at first.

Dr. Smith has employed this plaster in several cases of neuralgia, especially about the head, and has obtained from it the well-marked effects of aconite; in some instances so decided as to require the removal of the plaster for a time. He has also used it in painful tumours of the breast with much satisfaction.—*American Journal of Pharmacy.*

TEST OF THE PURITY OF ULTRAMARINE.

Dr. Bernheim proposes the following test for the examination of commercial ultramarine:—Two ounces of sulphuric acid are diluted with twenty ounces of water; the samples of ultramarine introduced into separate test tubes in quantities of fifty or one hundred grains, and the acid added until the blue colour is converted into a reddish one. The quantity of acid used indicates the relative value of the ultramarine as a colour. When smalt is present the colour is not entirely destroyed, and chalk is recognizable by the effervescence.—*Kunth und Gewebeblatt für Bayern*, 1853.

ON THE PURIFICATION OF SULPHURIC ACID FROM NITRIC ACID.

BY M. PELOUZE.

The fact that ammonia is capable, in virtue of the hydrogen which it contains, of decomposing the nitric acid and nitrous oxide present in sulphuric acid, may be taken advantage of for purifying sulphuric acid. These substances frequently present in sulphuric acid are very detrimental in some cases, for example, in dyeing. By the use of half a per cent. of sulphate of ammonia, the most impure acid may be rendered perfectly free from these substances, and in the generality of instances, from one to two thousandths is quite sufficient. The salt should be introduced into the lead pans in which the sulphuric acid is concentrated.

It is the opinion of some, that the injury suffered in the platinum vessels used for the concentration, is owing to the presence of nitrogen compounds; and besides this, it appears that sulphuric acid containing nitric acid is less suited to the purification of oils than pure acid.—*Ann. de Chim. et de Phy.*, 3 ser., vol. ii., p. 47.

CRAYONS FOR WRITING ON GLASS.

BY R. BRUNNQUELL.

The author prepares crayons for writing on glass, so as to enable the contents of glass vessels to be described immediately upon them in the following manner:—Four parts of spermaceti (or stearine), three parts of tallow, and two parts of wax are fused in a cup; six parts of minium and one part of potash are then stirred into it, the mass kept warm for half an hour, and then poured into glass tubes of the thickness of a lead pencil. After rapid cooling, the mass may be screwed up and down in the tube, and cut to the finest point with a knife. A crayon is thus obtained which will readily write upon clean dry glass.—Dingler's *Polytech. Journal*, vol. cxxvii., p. 236, and *Chemical Gazette.*

ON THE STATE OF PHARMACY IN GERMANY AND PRUSSIA.

BY M. BUSSY.

(*Concluded from page* 596, vol. xii.)

THE MANAGEMENT OF PHARMACEUTICAL ESTABLISHMENTS.

It would be very far from the truth to suppose that the system upon which pharmacy is carried on in Germany in any way tends, to diminish the spirit of emulation among the pharmaceutists of that country, to introduce negligence in the management of their business, or to lower the character of the educational studies.

With regard to the general manner in which the business is conducted, it is difficult, except from actual inspection, to form any conception of the order, quiet, and regularity which are maintained in a German pharmaceutist's shop. These establishments never present that superfluity of exterior decoration which in other countries fixes the attention of the passers; a simple inscription, sometimes, perhaps a sign placed over the entrance, scarcely distinguishes the pharmacy from the neighbouring dwelling-houses ; within all is quiet and orderly, as is accordant with the nature of the business. Several assistants are engaged in the preparation of medicines, one person only, and most frequently the principal, being engaged with the customers ; he receives the prescriptions and distributes them among the assistants for preparation. When the medicines are completed they are examined by the principal, to ascertain whether they agree with the prescriptions. In many shops the customers are not admitted into the place where the medicines are prepared, but remain in a kind of ante-room or vestibule. In the less extensive establishments there is always a small space, a kind of office, reserved for the preparation of medicines. The pharmaceutist is compelled by the regulations to write upon each label the name of the person, the date, and the mode of administering the medicine. In some states it is customary to make use of coloured labels for external applications, so as to make a more marked distinction between them and others than is effected by a written label.

As the pharmaceutists in Germany are required to prepare the greater part of the substances sold by them, and as most of the pharmaceutical establishments in large towns are on a very extensive scale, they are provided with well-arranged

laboratories, in which steam is very ingeniously employed as a source of heat for the preparation of infusions, decoctions, distilled waters and extracts, for evaporation, and in short all the operations which require the aid of a moderately elevated temperature. These laboratories likewise contain very efficient and perfect chemical and mechanical apparatus.

The difficulty of creating new establishments prevents many men of experience from meeting with suitable positions as principals, and this circumstance likewise ensures the capability of the assistants in the pharmacies.

INSPECTION OF PHARMACEUTICAL ESTABLISHMENTS.

The inspection of pharmacies is provided for by the Prussian law; each one must be visited at least once every three years, and more frequently if the inspectors should think it requisite.

The visits of inspection are made in the presence of the "kreis-physicus," by one or more pharmaceutists generally selected for the office from some other neighbourhood.

The pharmaceutist whose shop is inspected is bound to submit to the inspectors his concession, his diploma, the legal pharmacopœia, the tariff of medicines, the regulations referring to the exercise of the business, together with the most recent alterations which have been made, further the journal of the laboratory work, an account of poisons sold, an herbarium of indigenous officinal plants, and a packet of prescriptions with the prices of the medicines affixed. The assistants are required to produce their certificate of apprenticeship, to answer questions relating to pharmacy or chemistry, and to explain a passage in the Pharmacopœia. The apprentices are also examined, with a view to ascertain their capacity and acquirements, due allowance being made for the length of time they have been receiving instruction.

These visits or inspections generally occupy several days, and it will readily be understood that they require some time. In addition to the above-mentioned particulars the whole of the medicines included in the tariff are submitted to chemical examination by the inspectors, who carry with them the requisite chemical re-agents. The pharmaceutist visited has to pay about six shillings for the cost of re-agents, and has moreover to bear the expense of the extraordinary visits which the inspectors may think fit to make. Minutes of the inspection are taken and transmitted to the "medicinal rath," whose duty it is to institute proceedings against such pharmaceutists as may be found to have infringed the law—a circumstance, however, which very rarely occurs. In any case the "medicinal rath" addresses to the pharmaceutist who has been visited an official letter, containing a résumé of the report made to him, adding at the same time any remarks of compliment, advice, or reprimand, which he may consider necessary.

The reports made by the inspectors are sometimes very minute, and show how far their examination has extended, and the degree of care with which it has been executed. The following is an extract from the official letter, addressed by the "medicinal rath" to a pharmaceutist on the occasion of an inspection of his shop:—

"The concentrated sulphuric acid had a density of only 1.832; the extract of belladonna was not entirely soluble in water; the hydrated peroxide of iron contained a small quantity of chlorine; the iodide of potassium contained a trace of iodate; the loft appropriated to the drying of plants is not sufficiently ventilated, it requires an additional window; the herbarium is not kept and arranged in a proper manner; the inspectors have not found the Military Pharmacopœia in your shop; your apprentice does not possess a sufficient knowledge of the Latin language—you should pay attention to his improvement in this respect," &c.

These passages will be sufficient to give an idea of the attention which is directed by the inspectors, not only to the nature of the medicines themselves, but also to everything relating to the good management of the business.

The regulations laid down by the Prussian laws for the inspection of pharmacies is, upon the whole, analogous to those observed in France, but there are some peculiarities in the practical details which are deserving of notice.

The French law makes no mention of anything besides the examination of medicines, omitting altogether the pupils, the general state and management of the shop and laboratory.

The establishment of an herbarium in each pharmacy would be very desirable in France, inasmuch as it would encourage the study of botany by the pupils, a subject

which is now too much neglected. It would moreover be of practical utility. A well-arranged herbarium of officinal plants would very frequently be of service to the pharmaceutist in ascertaining, by comparison, whether the drugs obtained in commerce are really the true species.

The most important of all the provisions of the Prussian law relating to the inspection of pharmacies is, without doubt, that which empowers the medical legislative authorities to address to the pharmaceutists such observations as they may deem necessary from the result of the inspection. Commendation or censure thus officially expressed by a superior and competent authority, perfectly well informed as to the particulars of the case, are far more effectual means of keeping the pharmaceutists in the faithful exercise of their duties than an inflexible law, which would leave to the inspectors only the choice of one or other penalty, and would admit of no intermediate course between a tacit approbation and a legal prosecution. There are, however, a multitude of circumstances relating to the management of a pharmacy, or the quality of medicines, which may call for notice, instances of involuntary negligence, which, if tolerated, might ultimately prove injurious to the public, although not of sufficient gravity to justify the institution of legal proceedings against the pharmaceutist. Admonition is, indeed, sometimes given by the inspectors themselves; but being merely verbal, and wanting in any kind of legal recognition, is not so likely to produce the desired effect.

SECRET REMEDIES.

After what has already been said, it is scarcely necessary to state that the pharmaceutists of Germany are interdicted from selling or announcing for sale any secret remedy; nevertheless, they sometimes furnish these remedies on the authority of a physician's prescription.

In France, the law with regard to this point is the same, but it is not carried into effect. A decree of the 18th of August, 1810, prescribed the conditions which were to be observed in making known the formulæ for new and useful remedies. But the wise provisions of this decree have not been taken advantage of. Instead of following them out in their strictest sense, the legislature has reserved the dangerous right of granting to certain inventors an authority to vend and advertise their medicines. The granting of these privileges, to which is attached a pecuniary consideration, far greater than that of a pharmaceutical concession in Germany, is not subject to any conditions. Neither the medical collegiate bodies nor the juries charged with the supervision of pharmaceutical affairs, are consulted on the occasion. And further, these privileges have the great objection of being unlimited in duration; so that, even at the present time, there are being sold, under the sanction and patronage of the government, the vilest compounds, which are both antiquated and inferior to any that can be prepared by a rational application of pharmaceutical knowledge, but which have acquired a certain *prestige* in the eyes of the vulgar, from the government sanction, and more especially from the mystery in which they are enveloped.

THE SALE OF POISONS.

The provisions made by the Prussian law for the sale of poisons, closely resemble those which obtain in France. They must be kept in separate closets, and not sold except under certain conditions, to persons free from suspicion, provided with a due authority, and for determinate purposes, under a penalty of 3000 francs. A poisonous substance, when sold by a pharmaceutist, must be enclosed in a box tied and sealed. On the exterior the name must be written in German or French, and Latin, according to the locality, with the addition of three crosses, or a label with a death's head.

In some states of Germany it is necessary, besides the above precautions, for the receiver of the poison to give a receipt, to which he affixes his seal, and running thus:—"I the undersigned declare that I have received from the pharmacy of M. ———, (name and quantity of the poison), packed according to the regulations labelled and sealed (use to which it is to be applied); and I make myself accountable for any accident which this drug may occasion."

THE DRUGGISTS.

The Druggists in Germany are not allowed to sell any compounded medicine, although they are at liberty to sell simple drugs. They may not sell medicinal drugs by retail.

It is impossible to fix rigorously the limit between retail and wholesale; and in order to obviate the difficulties to which such an uncertainty would give rise in practice, the government has published a list of the drugs which may be sold by Druggists in any quantities, and a list of those which must not be sold by them below a certain weight.

HOSPITALS.

With very few exceptions the medicines required for hospital use are prepared by the pharmaceutists of the town.

The larger hospital at Berlin is provided with medicines by the king's pharmaceutist, and they are prepared under the direction of M. Wittstock.

The prices of medicines for hospitals, or for charitable institutions, is based upon a tariff, upon which the contractor agrees to make a certain reduction. Very frequently the one who makes the greatest reduction is chosen, but sometimes they are furnished successively by the several pharmaceutists of the town, and under the same conditions.

In the preparation of these medicines the legal pharmacopœia is generally followed, however many hospitals and other charitable institutions have particular formulæ ; thus, for instance, there is a pharmacopœia for the paupers of Mayence, entitled, "Formulare Medicum pro pauperi Maguntinis."

Independently of these necessary and appropriate reductions, pharmaceutists are frequently required to make a reduction in their charge for medicines, upon the simple suggestion of the physician ; who, for that purpose, writes upon the prescription, "PP.,.pro pauperi."

RÉSUMÉ.

It will be seen from the above account that Pharmacy in Germany is regulated by an essentially preventive legislation ; it constitutes a species of organized public service, subject to the supervision of a minister and a special administrative body, who do not for an instant lose sight of the interests of the public in everything that relates to the preparation and sale of medicines. The two most important features of this organization, are, the limitation of the number of pharmacies, and the establishment of a fixed scale of prices for medicines. It is these two provisions, the latter of which is in truth but a consequence of the former, that peculiarly distinguish the Prussian pharmaceutical law from that of France.

The limitation of the number of pharmacies as it exists in Prussia, is not absolute. The government no longer grants exclusive privileges to pharmaceutists, but merely concessions, reserving at the same time the right of increasing their number to such an extent as the necessities of the population may demand.

Hitherto the government have exercised this right with extreme reserve, and in such a manner as to lead to the opinion that it is not their intention to increase the number of pharmacies. Moreover, as public opinion and custom are in favour of this limitation, things may remain for a long time in their present condition, but this *statu quo* is very probably the result of habits acquired as a necessary consequence of the legislation relating to pharmacy.

It is very easy to perceive that a similar limitation with such a reserved power in the hands of the government, would, when adopted in a country governed by such principles of liberty as obtain in France, neither be attended with the dangers which are feared, nor with all the advantages which might be anticipated from it, for it would in reality be almost equivalent to a state of absolute liberty.

It would indeed be very difficult, not to say impossible, that any government left to its own free exercise, without any precise course of action laid down beforehand, without any administrative traditions with regard to the matter, could long offer any resistance to the solicitations of those who might demand the establishment of new pharmacies, or to the pressure of opinion, always disposed in France to the view that the public is interested in the extension of professions, and in competition between those who belong to them. In order that the limitation of the number of pharmacies in France should be attended with any serious results, especially if it was accompanied by the application of a tariff, it would be absolutely necessary, not to leave the matter, as in Prussia, to the decision of an administrative body, but that the law itself should lay down, in a precise manner, the conditions of such limitation.

In regard to all points which do not directly relate to the limitation and the tariff, the provisions of the French and Prussian legislation differ but very slightly. They

both tend to the same object, and almost always by the same means. There is, however, a fundamental difference in the mode of their application, for, according to the Prussian system, the supervision being more complete, more constant, more comprehensively organized, the power of the administration being better established and more extended, it is possible to prevent the commission of many offences which it is necessary in France to refer to the legal tribunals.

But by instituting a legal prosecution against a pharmaceutist a severe blow is given to his reputation, and recourse cannot be had to such an extremity without some very efficient grounds, consequently many circumstances which are not without some importance escape notice altogether, actually by reason of the severity of the law. If, however, there is any case in which it is more desirable to prevent offences than to punish, it is certainly the present one. It would, therefore, seem fit to render the supervision of pharmacy more efficacious to introduce into the measures adopted with this view consistency and completeness, to give to the body charged with this supervision a moral influence which it has never yet possessed, and a certain degree of authority which would in many cases obviate the necessity of having recourse to the legal tribunals.

Among the several points of detail which the exercise of pharmacy in Germany suggests, I will confine myself to mentioning those provisions whose introduction in France appears desirable, and which are, moreover, in accordance with the general spirit of legislation in that country :

The separation of pupils into two classes; those properly so called and assistants (aides); the administration of the oath under conditions which would render this simple formality a serious matter; the establishment of an inspection of pharmacies not only with regard to medicines, but likewise to the entire management of the business and the laboratory; to require each pharmaceutist to keep an herbarium of officinal and other plants used in medicine; that an abstract of the reports made to the authorities on the occasion of inspections, should be addressed in an official manner to each pharmaceutist, and that these reports should furnish an opportunity of direct communication between the administrative body and the pharmaceutists; the introduction of stricter regulations with regard to secret remedies; lastly, the introduction of written theses and chemical analyses into the examinations.—*Journal de Pharmacie.*

ON THE PREPARATION OF CARBONATE OF POTASH.

BY CARL. WEBER.

The Prussian Pharmacopœia directs that this substance is to be prepared by mixing one part of purified bitartrate of potash with half its weight of nitrate of potash, both in powder, heaping the mixture, which must be perfectly dry, in a cone upon an iron dish, and igniting it with a red hot iron. The deflagration goes on rapidly. When the cold, greyish-white mass is treated with half its weight of distilled water, the whole left for some time, the liquid filtered off and evaporated, a very pure carbonate is obtained.

The author states, however, that in preparing the salt in this manner, he has frequently found that the filtered solution of carbonate, although perfectly colourless at first, becomes suddenly brown during the evaporation, and that there is at the same time a considerable evolution of ammonia; the brown colour was permanent, and the dry salt was itself yellowish, so that a repeated solution, filtration, and evaporation were necessary. By this means some minute particles of carbon were separated.

In the course of some experiments as to the cause of the colouring, Weber remarked, that the operation is successful only when, before mixing, the bitartrate is heated until it begins to turn brown, and the nitrate of potash until it begins to melt.

The author is inclined to believe that the colour acquired by the carbonate is owing to the decomposition of cyanogen formed during the deflagration. The evolution of ammonia during the evaporation tends to render this more probable.—*Allgemeine Pharmaceutische Zeitschrift.*

IMPROVEMENTS IN THE MANUFACTURE OF CITRIC AND TARTARIC ACIDS; AND OF CERTAIN SALTS OF POTASH, SODA, AMMONIA, LIME, AND BARYTA.

(*Astley Paston Price's Patent, enrolled April* 14).

These improvements consist, 1st. In combining citric acid with potash, soda, or ammonia so as to form soluble citrates, and subsequently decomposing the same by means of salts of lime or baryta; 2nd. In combining bitartrate of potash, with potash, soda, or ammonia, so as to form soluble tartrates, and decomposing the same, by means of salts of lime or baryta; 3rd. In obtaining salts of potash, soda, and ammonia, by combining bitartrate of potash with potash, soda, or ammonia, and decomposing the same, by means of acid or acid salts; 4th. In obtaining salts of potash by decomposing tartrate of potash by means of acids or acid salts, and by decomposing the same, by means of salts of lime or baryta; 5th. In obtaining salts of potash and tartrates by double decomposition of salts of soda, or ammonia and tartrates; 6th. In obtaining lime and baryta salts. To be employed in producing salts of potash and ammonia, by decomposing salts of lime and baryta with salts of soda, and by decomposing salts of baryta with salts of lime.

IMPROVEMENTS IN BLEACHING PALM OIL.

(*Dixon's Patent, enrolled May* 1.)

In this process palm oil is bleached by passing free or naked steam through it while in a fluid state. The palm oil to be bleached is placed in a wide or shallow vessel, on the lower surface of which are placed several pipes pierced with a considerable number of small holes, and supplied with steam from a boiler. The steam being admitted into the pipes, first heats them by its condensation, and then melts the oil, if it is in a solid state, and afterwards rushes through the small holes, and passing through the liquid oil, escapes.

It is preferable to expose the surface of the oil to air and light during the operation. The pressure of the steam and its temperature, and the mode of introducing it, and the form of the apparatus, may be varied.

IMPROVEMENTS IN THE DISTILLATION OF TAR.

(*Shand and M'Clean's Patent, enrolled May* 5.)

The tar is put into the still, and heat applied to distil off all the naphtha. The heat is then raised and an oil containing naphthaline distils over. To obtain this naphthaline the patentees proceed as follows:—They put into a still of any convenient form the oil containing the naphthaline, to which they add a sufficient quantity of caustic lime, or any other caustic alkaline or earthy substance, or oil of vitriol or any other acid, in order to separate the impurities. Heat is then applied, and a volatile oil, containing naphthaline in a concentrated form distils over; this naphthaline is separated from the oil by cooling it down to a temperature of about 40° Fah. and by expression. The oil remaining after this separation of the naphthaline is then heated in the following way:—The oil is put into a suitable still and a steam heat of about 212° Fah. is then applied, when a very light oil distils over; the oil which remains in the still after the light oil has been distilled over is also valuable for certain purposes.

THE TWO PARALLEL SOCIETIES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In your report of the proceedings of the Special General Meeting of the Pharmaceutical Society, you have made me state, in your June number, p. 565, not only that which I did not say, but that which is contrary to fact.

The parallel drawn by me between the Law Institution and your Society is not correctly reported.

The Law Institution was established long *before* the passing of the Act rendering the examination of law students compulsory. The Law Institution obtained the Act through their influence, and the power to appoint examiners out of their own body is reserved by the Act to the Council.

The examination *is* compulsory, but it is quite optional whether persons who have been examined and admitted as attorneys should subscribe to the funds of the Society by becoming members. The Act was not retrospective, attorneys admitted previous to the passing of the Act, and in consequence the then members of the

institution were not required to undergo an examination. Here the parallel between the two societies ceases.

The point which I brought before the meeting was, that the members of the Law Institution might cease to be members and withhold their subscriptions; but the Council had no power of striking their names off the register, or, as we call it, "roll of attorneys." The Council of the Pharmaceutical Society would fain assume the power, by the proposed bye-laws, of striking off the register of Pharmaceutical Chemists all persons who might desire to withdraw their names from the Society and cease to be members, an act both unjust and illegal.

I am, Sir, your most obedient Servant,

Lincoln's Inn Fields, June 3, 1853. C. H. COLLETTE.

[We insert the above letter to correct an accidental error in our report, although the argument is not affected by it. It was never disputed that persons may be registered as Pharmaceutical Chemists without becoming Members of the Society. This is clearly implied in the tenth clause of the Act. But all these persons on registration as Pharmaceutical Chemists must pay a fee of ten guineas. If the Members referred to in the sixth clause will pay the same fee they will also be permanently registered, not only as Pharmaceutical Chemists, but as Life Members. But they are exempt from the fee, simply on the ground that they are Members according to the terms of the Charter. In other words, they subscribe to the funds of the Society in the manner provided in the regulations thereof; and these regulations require that they shall either pay the annual subscription of one guinea, or commute the same by the payment of ten guineas. They have one other alternative, which is, they may pay nothing, carry on business as before, but cease to be registered by, or in any way identified with, the Society.—ED.]

THE PATENT MEDICINE LICENCE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—I am anxious to direct your attention to the proposed alterations in the stamp duties by the Chancellor of the Exchequer, as I am disposed to consider it a favourable opportunity for an application on the part of the Council of the Pharmaceutical Society respecting the patent medicine licence.

It appears most unjust that the Chemists of London should be compelled to pay *eight* times the amount paid by their *country* brethren, the cost of a town licence being two pounds, that of a country one only five shillings. I believe it is generally acknowledged that the sale of patent medicines is larger in proportion to the population in country districts than in London.

Should the Council entertain the subject and be successful in obtaining an equalization of the duty, they will richly deserve the gratitude of every Chemist residing in the metropolis.

I am, Sir, yours respectfully,

126, *St. John's Street Road, June* 15, 1853. JOHN MARSHALL.

[We think it would be prudent to wait until the Society has recovered from the effects of the late proceedings.—ED.]

TO CORRESPONDENTS.

Juvenis (Chatham).—Liquor sennæ aromaticus, see vol. ix., page 524. This is probably the preparation referred to. The cultivation of medicinal plants, see vol. x., pages 115, 168, 236, 297, 340.

N. A.—See Gray's Supplement, edited by Redwood, page 644, second edition.

Denton.—The spirit licence and duties Act is published entire, vol. vi., page 117. Stills of less capacity than two gallons do not come within the provisions of this Act.

Amator Pacis observes, "at a moment like the present, when the labour of years seemed on the point of realization, when the Legislature have at length recognized the existence of Pharmaceutists as an educated body, it is difficult to understand the motives which influence the "Secret Committee" in its attempt to neutralize all past exertions, and drag down Pharmacy to its original level. The matter in dispute is so plain in all its bearings, that argument should not be required to prove the "exemption" claimed a mere sophism. Suppose for a moment the Act had *not* been obtained, would Members have been allowed to withhold their subscriptions, and yet to continue their Membership? Certainly not; their connexion with the Society was dependent upon their furnishing a proportion of the funds, without

which the Society could not exist. If, under the Charter, they could be Members only by supporting the Society, upon what principle of justice can they take the benefit of the "*Act*" to release them from such support? The Act is permissive and not compulsory. It is competent to any one to keep his money in his pocket, and carry on his business of Dispensing Chemist, &c., without let or hindrance, but if he wish to retain his standing in the Society, which alone can constitute him "Pharmaceutist," he should be willing to maintain the source from which he derives his honorary distinction, at least until time shall have made apparent the value of the title to which he aspires, and until the superior education of the class shall, by the force of public opinion, have paved the way to a compulsory examination, and thus given the Society the means of self-support." Our correspondent will appreciate our reason for omitting one paragraph in his letter.

We have received a letter from Mr. Tomlinson and several other Members in the country, containing opinions similar to the above, and deprecating the existence of any division in the Society at the present time.

Mr. Sewell's communication is deferred until next month.

Nero (Exeter).—The heating and spontaneous ignition of organic substances, which sometimes occurs when considerable quantities are left undisturbed for some time, arises from a kind of fermentation, in which heat is developed.

Camera Obscura.—The process for iodizing photographic paper, referred to, consists in exhausting the air from the vessel containing the solution with the paper, when the iodide becomes more uniformly absorbed.

Amidogen.—In the mixture referred to the silver is reduced by the oil of cloves, the latter being at the same time resinified.

S. P. (Brighton).—The leaf of the fuschia appears to contain two distinct colouring matters. The green colour is destroyed by acetic acid and restored again by sulphuric acid. This result is probably due to the acetic acid forming with the green colouring matter a colourless compound, which the sulphuric acid decomposes.

I. M. C.—Hoblyn's *Dictionary of Medical Terms*, or Hooper's *Medical Dictionary*, would probably supply the information required. The latter is the most complete work. The price is about 30*s*. It may be got through any bookseller.

The Pereira Memorial.—Circulars, with a Prospectus of the Pereira Medal, have been sent to the local Secretaries of the Pharmaceutical Society, from some of whom subscriptions have been received. The amount at present subscribed is sufficient to defray the expense of the die, and we hope in the course of the ensuing month, that enough will be received to endow the medal. We intend to publish a list of additional subscriptions on the cover of our next number.

Dr. Pereira's Library, &c.—The sale of Dr. Pereira's library took place on the 17th and 18th of June. Some of the works realized the full publishing price or even more, others were sold at much less than their value. The microscope, with the polarising apparatus, brought £47. Among the property sold, were a considerable number of lecture diagrams, which realized much less than might have been expected. We regret the dispersion of this valuable collection, which comprised many works not easily procurable, complete sets of periodicals and books of reference, English and foreign, some of them deriving additional interest from marginal notes by Dr. Pereira. It was unfortunate that the sale occurred at a time when the Council was not in a position to come forward officially in competition on behalf of the Society, as the librarian, in the absence of official authority, could do no more than purchase a few lots on his own responsibility.

The Society of Arts have awarded their medal to Mr. Toynbee, F.R.S., Aural Surgeon to St. Mary's Hospital, for his invention of an artificial membrana tympani (drum of the ear), in cases of deafness dependent upon perforation or destruction of the natural organ.

Erratum.—Page 591, vol. xii., *for* f℥j is equal to ℥ss, *read* f℥j is equal to ℥ss.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. II.—AUGUST 1st, 1853.

REPORT OF PROGRESS—THE ELECTION OF MEMBERS—THE EXAMINATIONS—THE SCHOOL OF PHARMACY.

The temporary cessation of the business of the Pharmaceutical Society, reported in our last number, has been followed by renewed activity. At the meeting of the Council, on the 6th of July, the Secretary officially reported the confirmation of the Bye-laws by the Secretary of State, the proceedings of the former meeting were confirmed, the standing committees for the ensuing year were appointed, the Members were elected under the new Bye-law (sec. 1, clause 2), and the days were fixed for proceeding with the examinations.

The period for admission into the Society without examination has now terminated, and the number of Members, Associates, and Apprentices, at the present time amounts to about 4,000, of whom a considerable proportion have been examined, although the majority belong to the class of original Members who have been admitted to the rank of Pharmaceutical Chemists on account of their previous position in the business, and their contributions in support of the Society. The future lists of new Members and Associates will represent the advancement in the educational qualification which it is the object of the Society to promote. The advantages belonging to this improved position will induce a larger number of candidates to come forward, the system of examination will become more matured and methodical, and the education more complete.

We have heard it stated that the examination is not at present sufficiently practical, that some young men who have passed and obtained certificates of qualification, have been found less efficient in the ordinary routine of business than others who have not undergone the ordeal. They may be learned in the science of the atomic theory, and skilful in the application of chemical tests, but inexperienced in dispensing prescriptions, and too proud to clean a bottle or a counter. An experienced Member of the Society (formerly a Member of the Council) lately asserted that he would rather have one of the old-fashioned Assistants, who was *practically acquainted with his business*, than a genius fresh from the laboratory, big with chemical symbols, and above his work. There may be some foundation for the remark, but this is no argument against the improved qualification which the examination is intended to secure. One of the "old-fashioned Assistants" may have been a studious and industrious man; he may have done voluntarily that which all ought to do, but which the majority, unless compelled, are too apt to neglect. A clever Chemist is not of necessity a quick dispenser or a good counter man. A combination of talent and aptitude is required which may be assisted, but is not likely to be retarded or frustrated, by the mental cultivation required by the Society. If there be some young men whose heads are turned by a little science, and inflated with notions incompatible with the trade of the Druggist, the evil will cure itself—they will find their level. The result of our own observation is the decided conviction, that every Chemist would be promoting his own interests as well as the respectability of his profession, by declining to engage any Assistant as a dispenser of prescriptions who has not passed the examination. It is in contemplation to make the examination more practical, and by degrees more stringent; and we think the introduction of a dispensing counter in the laboratory at Bloomsbury Square, would be found useful to those young men who, although well grounded in the science of Chemistry, have not had the advantage of the requisite experience in a shop.

During the time that the functions of the Board of Examiners were suspended,

no little dissatisfaction prevailed among the candidates, of whom above two hundred were on the list for examination, and several appeals were made to Members of the Council for redress. To a young man who is primed and loaded—or, in technical language, ground—for an examination, the delay of a month or six weeks may appear to be a serious calamity, as he may during that time lose his charge and flash in the pan. But those who duly appreciate the examination, not as an opportunity for the display of superficial knowledge, but as a guarantee of competence for the duties they will have to perform in after life, instead of fearing the evaporation of the knowledge they possess in a few weeks, would avail themselves of the extra time for study, and endeavour to fix what they know more permanently on their memory. When the force of this truth is more generally understood and acted upon by young men, the value of a certificate of examination will be more appreciated by their employers.

We have of late heard complaints of the difficulty of obtaining Assistants. It was formerly a source of complaint, that among the numerous applicants for situations, scarcely one in fifty was competent to dispense prescriptions. It is now supposed that the deficiency in the number arises from the dread of the examination, which deters many from following the business. We attribute it rather to the demand for skilled labour in the colonies, which has induced a large number to emigrate. Of this we are quite certain, that as a body the Assistants of the present time are much better educated than those who formerly flocked to London in search of situations. There is still, however, much room for improvement, and we have no doubt that the demand for competent Assistants will in due time be met by a supply.

The appointment of officers for the performance of the several duties connected with the Library, Museum, and Laboratory, and the other arrangements of the School of Pharmacy for the ensuing session, have engaged the attention of the Council. The subject having been referred to a committee has been fully considered, and the result will in all probability be reported in the Transactions of the Society for next month.

On taking a review of the position and progress of the Pharmaceutical Society, we think there is reason to be encouraged. Obstacles have from time to time arisen, and difficulties have occurred. In the first instance these arose from external opposition, and they have been overcome by the united efforts of the Members, and their determination to go forward. We have now nothing to contend with but internal disaffection or treachery, and on this ground we entertain no apprehension, as we feel assured that the good sense and sincerity of the majority will neutralize any factious opposition with which the progress of the Society may be assailed. This subject has been concisely and rationally dealt with by a correspondent, from whom we have received the following

ANALYSIS OF THE MEMBERS OF THE SOCIETY.

To the Editor of the Pharmaceutical Journal.

Dear Sir,—On looking over the July number for 1853, I was much interested at seeing the array of names of those who had joined us during the months of May and June of the same year, and also felt a degree of irritable regret at seeing other communications which would imply vexatious opposition on the part of some to the well-being and progress of the Society, and thought, even now, instead of our being but of one heart, and one purpose, that three classes could be almost distinctly recognized in one body. Those who feel an abiding interest in our success, and a hope that we may reach the position of the first institution in Europe for the diffusion of knowledge of that character that first led to our union: a second class, of those who have but little feeling of either kind, so that whether we sink or swim it would be alike unfelt or cared for: and a third section, who cannot be called indifferent, but are active in raising impediments to obstruct the free going of that machinery which will enable us to move over the ground, and to reach the consummation so ardently desired.

To the first class permit me to say, brethren, let "onward" be your motto; many of you were at the foundation of the Society—great things were anticipated. Achieve great things! I have read that Sir C. Wren observed, that if he engaged to throw a bar over the stone gallery of St. Paul's, he would assuredly aim at clearing the iron gallery. Attempt what is great, for you have the material for doing it. You have had excellent Presidents, a useful monthly periodical, information such as Chemists a quarter of a century since might have looked for in vain; connect with these the Library and Laboratory, the Museum and its rare specimens, with a Benevolent Fund, and it will be apparent that there has been no failure of promise held out at our commencement, or of hope indulged during our progress. I cannot but think that means will shortly be found to build in an eligible place an Institution which shall rank number One among the erections devoted to the furtherance of the Arts and Sciences in our fatherland. Let our expression be, May the blossoms of this Society never be blighted by fear, folly, or treachery!

To another and numerous class allow me to say, Welcome as brethren of the Pharmaceutical Society. It is true that some have laboured and some have the benefit of their exertions; but as it is far, very far from late to "redeem the time," a warm interest, contributions to the Museum, Laboratory, Benevolent Fund, and bequests, would agreeably compensate for the delay of an early acknowledgment of the claims of this excellent Society, now established by the laws of this realm. Let me suggest, also, as even the least esteemed trades have guilds or companies, that we occasionally exhibit some gentle initiative to our Council until we obtain a stand such as becomes the education, acquirements, and especially the knowledge and practice of a profession which equally affects the physical and moral well-being of our fellow-men. To suppose that Chemists are to be subordinate to the companies I have previously named is derogatory, and it is time, as our pretensions claim a different grade, that we take the position that, in an educational as well as a commercial sense we may in all justice assume.

To the very small minority, whose movements I have not been ignorant of, grant me the liberty of offering my real and sober advice: leave the Society in which you are rather a hindrance than a help, and although I would not use the expression so frequently heard in public meetings of "Turn him out," yet I would respectfully suggest to the Council the advantage of paying back all the monies which have been advanced by such querulous persons. It is but very few that have at all a kindred spirit with them, as it must be quite apparent that all immature, imprudent, and impertinent acts are decidedly injurious to us as a Society.

"Nought will make us rue
If we to one another be but true."

Remaining, dear Sir, yours respectfully,

Collumpton, July 14, 1853. JOSEPH FOSTER.

Without doubt the advice of Mr. Foster to the hostile Members would, if acted upon, conduce to the harmony and prosperity of the Society; but if we may judge from the animus manifested by the parties concerned, we suspect they would neither acquiesce in the proposition nor rejoice in the result. There is a distinction between the fair and honest discussion of opinion which prevails, and ought to prevail, in every society, and perseverance in a factious opposition—war to the knife—accompanied with personal abuse, and a total disregard of the decision of an overwhelming majority.

We may imagine twenty-one persons in charge of a vessel containing a valuable cargo, which they are about to bring into port. They have surmounted the dangers of a long voyage and the land is in sight, but there is still a difficult point to pass, and their course is between Scylla and Charybdis. The wind being favourable it is proposed to make sail and proceed, on which an amendment is moved that they take to the boats and leave the vessel to its fate.

Twenty support the motion, one the amendment. It might be supposed that the one who is in so small a minority would yield to the judgment of his colleagues; but no, he is determined that the vessel shall not sail into port if he can prevent it, and as he has been frustrated in his proposition he entangles the rigging, bores a hole in the vessel, and takes himself off in the life-boat, leaving his companions to repair the damage as best they can, and persevere in the performance of their duty, which his wanton conduct has made more difficult, while he assails them from the shore with a volley of invective because they have refused to strike their colours as he has done himself. To such a person the safe anchorage of the vessel would be a source of mortification. Like Jonah, he has prophesied destruction, and nothing short of a fulfilment of his prophecy will satisfy him. But the selfish pertinacity of Jonah was powerless, and brought upon him a suitable punishment.

THE QUALIFICATION OF SUPERINTENDENTS FOR ADMISSION AS MEMBERS.

The meaning of the term "Superintendent," as employed in the Charter and Bye-laws not being generally understood, a brief statement of the circumstances which led to the adoption of the term will serve as an explanation. At the time the establishment of the Pharmaceutical Society was proposed a question arose whether assistants should be admitted to the privilege of membership. On one side it was thought that as mental qualification was ultimately to be the primary condition of membership, all persons possessing this qualification ought to be eligible to the privileges, whether in business on their own account or not. But on the other side an objection was raised, that, as one of the functions of the Society is the protection of the general interests of the Members, inconvenience might arise if any persons, except those who have a vested interest in the trade, were allowed to participate in the government of the Society—to attend and vote at general meetings, and to interfere with the laws and regulations. The assistant having a right to vote would naturally claim the right to attend the meetings; or, if subject to the jurisdiction of his employer in regard to attendance, his right of voting would be a mere fiction. In case the respective interests of principals and assistants should clash, or appear to clash, on any question, the principals would either be outvoted by their assistants, or liable to the imputation of tyranny if they interposed their authority, and denied them the liberty to neglect their duties in the shop for the purpose of attending the meeting. This, it was feared, would lead to a feeling of rivalry, if not hostility, between the two classes, whose mutual welfare is mainly dependent on the existence of a good understanding between them. The position of an assistant being one of transition, and his ultimate destination being that of a principal, is was thought that his temporary exclusion from a share in the management during the time that he is not his own master, would be more than compensated by the subsequent advantage which he would permanently derive from the regulation. Accordingly it was decided, to the satisfaction of both parties, that assistants should be admitted as Associates, to enjoy all the privileges of membership except that of attending and voting at the general meetings of the Society.

But it was necessary to provide for the case of those who, having obtained permanent situations as managers or superintendents of the businesses of others, were identified in interest and in position with principals, although not actually in business on their own account. To such parties the term Superintendent was applied, and it was not intended to comprise confidential assistants who, during the temporary absence of their employers, are responsible for the maintenance of order and regularity, but merely those whose employers are widows, or persons having a pecuniary interest but taking no part in the management of

the business, and who invest with absolute authority the person engaged as the ostensible master of the establishment.

The number of such persons is very small (not more than three have hitherto been admitted as Members on this ground), yet it was necessary to make provision for cases which have occurred, and which otherwise would hold an anomalous position, not being identified either with Members or Associates.

The Bye-law (section 1 clause 4) provides, that "superintendents applying to be elected Members, must be proposed and seconded by Members of the Council, who are required in every case to state in writing the grounds of the application. The Secretary is to make inquiry respecting the same, and is to report thereon to the Council, and the names of the candidates are to be exhibited in the Library of the Society for one calendar month previous to election."

These precautions are adopted as a security against the election of any persons who may not come strictly within the definition of superintendents in the sense in which the term is used in the Charter and Bye-laws. It must be understood, however, that the parties are subject to the same regulations with regard to examination, which apply to Members who are in business on their own account.

Since the circulation of the Bye-laws, we have received several communications from Members who have misunderstood the regulation, and have proposed for election assistants of two or three years' standing, whose qualification was founded on their good character, attention to business, and faithful discharge of the duties of their office during the occasional absence of their employers. It is obvious that if such parties were elected, every Chemist who employs two or three Assistants, might, on the same ground, recommend one as a superintendent for election as a Member; every assistant exercising authority in any department of a business might consider himself a superintendent, and aspire to become a Member. It would be impossible to draw the line between a superintendent and an assistant, and by degrees the grade of Associates would be reduced to the level of assistants of second or third-rate capacity, instead of representing, as it now does, young men many of whom are equal in experience and attainments to their employers, and only waiting for an opportunity to acquire a vested interest in the business, when they will enjoy the full privileges of Membership.

THE PEREIRA MEMORIALS.

The cover of this number contains a Supplementary List of Subscribers to the Pereira Memorial Fund. The amount required to defray the cost of the die and provide for the annual expense of the medals has been computed at £300, of which it will be seen a balance of about £140 remains to be collected. This we have no doubt will be raised without difficulty by the time the die is executed, if not before, and we shall publish a further List of Subscribers in due course.

The model for the bust of Dr. Pereira, by Mr. M'Dowall, R.A., is executed, and has been cast in plaster. Several intimate friends of the Doctor, who have seen the work in progress, have expressed their satisfaction with the execution and the accuracy of the likeness. Considering the difficulty of obtaining a good likeness from the materials available after the decease of the original, we think the sculptor has been very successful. We are informed that casts in plaster may be obtained from Mr. M'Dowall.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND REGISTERED APPRENTICES,

Elected in July.

MEMBERS.*

London.....	Andrews, Thomas Wm. Cox	25, Princes Road, Notting Hill
	Attwood, Alfred	61, Cannon Street
	Boothby, Henry Neal	72, Crawford Street, Marylebone
	Bowe, Thomas	16, Tichborne St., Haymarket
	Bristowe, Charles	69, Edgware Road
	Brotherton, William Henry	1, Clyde Terrace
	Carty, John	172, New Bond Street
	Chard, Frederick James	13, Eccleston Street South
	Chubb, James Carpenter	59, St. John's Street, Clerkenwell
	Cockrill, James	2, Wellington Street, Waterloo Town
	Collard, Aldred	Peckham Rye
	Cooke, John	63, High Street, Hoxton
	Cornelius, Joseph	Clapham
	Cox, Henry	4, Gray's Inn Lane
	Cross, Henry	4, Shepperton Place, New North Road
	Croyden, Charles	37, Wigmore Street, Cavendish Square
	Culpeper, William M.	31, Silver Street, Golden Square
	Curtis, Frederick	15, Crawford Street, Marylebone
	Elkington, Edward	Bermondsey
	Goosey, William	5, Ocean Row, Stepney
	Gorton, John George, Jun.	144, High Street, Whitechapel
	Goss, Samuel	130, High Street, Shoreditch
	Gristock, Thomas	42, South Street, Manchester Square
	Hackman, Leonard Lewis	24, Union Street, Bishopsgate
	Haine, John	110, Regent Street, Milbank
	Henty, Henry Martin	87, High Street, St. John's Wood
	Hillgenberg, Henry	38, Houndsditch
	Hill, Arthur Bowdler	11, Little Britain
	Holland, William Favell	9, Compton Street, Brunswick Sq.
	Hopkin, William K	5, New Cavendish Street
	Hora, Henry Whinfield	58, Minories
	Hugill, John	61, Cannon Street
	Huskisson, Henry Owen	77, Swinton Street
	Ingram, Robert	2, Queen's Terrace, St. John's Wood
	Jobson, Thomas C. W.	4, John's Row, St. Luke's
	Jolley, George	13, Curzon Street, May Fair
	Kibbler, Richard C.	3, Goldsmiths' Row, Hackney Road
	King, Robert	21, Princes Street, Hanover Square
	Knowles, William	Camden Town
	Lamacraft, William	7, Bentley's Place, Kingsland
	Leigh, Alexander	85, Goswell Road
	Lovell, Frederick George	10, Staverton Row, Walworth Road
	Lowe, Thomas Edward	Stafford Street, Bond Street
	Marris, Joseph	37, Berners Street, Oxford Street
	Mason, John Wallis	Upper Marylebone Street
	M'Dougall, William	174, Regent Street
	Ogle, William	Battersea
	Parnell, George William	3, Artichoke Place, Mile End Road
	Pepper, John	1, Bedford Street, Bedford Square
	Power, John H.	Denmark Hill, Camberwell
	Schacht, William	38, Houndsditch
	Simpson, Edmund P.	2, Bancroft's Place, Mile End Road

* This list comprises only those who have paid their fees and subscriptions.

London	Summers, James Richard ...43, Curtain Road
	Tompkin, Thomas .....1, Bridge Street, Vauxhall
	Tustin, Thomas H. .....London Hospital
	Walker, Henry .....9, Suffolk Place, Islington
	Watts, John Peter .....11, Sols Row, Hampstead Road
	West, Richard Timothy.....King's Road, Chelsea
	Wilbe, Salmon.....1, College Place, Chelsea
	Wilson, Thomas .....Upper Holloway
	Windle, William .....48, Portman Place
	Wright, John .....60, George Street, Portman Square
Aberdeen	Allan, Alexander
	Andrew, William
	Burnes, William
	Henderson, John
	Reid, David
	Sangster, John
	Williamson, Harvey
Alton	Stuart, Henry W.
Altrincham	Paulden, William
Andover	Bayley, George E.
Ardwick	Hill, William
	Wright, Joseph
Ashton-un.-Lyne	Turner, W. J.
Aylesbury	Payne, Fredk. William
Barnard Castle	Procter, Joseph
Barrhead	Freeland, John
Basford	Cutts, Thomas
Bath	Bright, William
	Jameson, Walter C.
Beaminster	Hine, Alfred
Bedale	Fowler, Edward
Biggleswade	Newbery, Henry
Bilston	Gray, Charles
	Kimberly, George
Birmingham	Bradbury, T. Garmeson
	Hipkins, Matthew
	Holdsworth, Thos. W.
	Lidbetter, Thomas
	Palmer, Chas. Fielding
	Palmer, Henry
	Pegg, Herbert
	Smith, John
	Thonger, Gilbert
Blackburn	Booth, James
Blackpool	Francis, George
Bognor	James, Henry
Boston	Lock, William
	Lewin, Edward C.
Brackley	Dearlove, Thomas D.
Bradford	Sheriff, Thomas I.
	Sutcliffe, James
	Turton, Luke
	Walker, John
Brandon	Cock, John
Brecon	Hall, Richard
Brentford	Ralfs, Henry Charles
Bridge	Thomas, James
Bridgend	Ballard, David
Bridge of Allan	Farie, Gilbert G.
Bridlington Quay	Forge, Christopher
Brighton	Aldridge, Alex. John
Brighton	Barton, Charles
	Holwell, William
	Wright, Fred. William
Bristol	Burnand, Wm. Wyatt
	Gibson, Wm. Middleton
	Keall, Powell Skinner
	Meredith, Edwin Rich.
	Player, Edmund
	Stoddart, Wm. Walter
Bromwich, West	Hodgetts, George
Builth	Casey, Patrick Joseph
Caerphilly	Evans, Samuel
Canterbury	Mount, William
Cardiff	James, John Parry
	Smith, Benjamin
Cardigan	James, Joseph Rhys
Carlisle	Carruthers, Jefferay
	Pattinson, Richard J.
Chatham	Crofts, Holmes C.
Chatteris	Negus, T. Richardson
Chelmsford	Pertwee, Alfred R.
	Pertwee, Edward
Cheltenham	Clarke, Benjamin
	Davis, Thomas
	Gregory, Edward Jas.
Chesterfield	Evinson, Thomas
	Jackson, Clay
Chippenham	Moore, Edward
Clapton (Upper)	Martin, Thomas
Cockermouth	Bowerbank, Fawcett
Coggleshall	Hoddy, Benjamin
Colchester	Lyon, Robert
Conway	Roberts, Thomas A.
Corsham	Scott, Robert
Coventry	Bullas, William
	Hinds, James
	Loveitt, George
	West, Henry James
Cowbridge	Thomas, John
Cranley	Herington, Joseph
Croydon	Barritt, George
Darlington	Barlow, Samuel
Dartmouth	Rees, William Henry
Deal	M'Diarmid, J. Buckwell
Deptford	Lloyd, Henry
Dereham, East	Mills, James Arthur
Devizes	Madge, James C.
Diss	Gosling, Thos. Preston
Dorking	Clift, Joseph
	Durant, Edmund
	Durant, Frederick

Douglas, I. of Man.....Quine, James
Dover .....Thomas, Robert
Downend.....Strange, Wm. B.
Droylsden .....Lawton, Daniel
Dukinfield.....Rowland, John
Dumbarton.....Babtie, John
Harvie, James Fulton
Dumfries.....Carruthers, Rd. Birrell
Dundee .....Murdock, William
Thomas, John
Dunse .....Veitch, James
Dunster .....Symons, William
Durham .....Monks, James
Nicholson, Joseph
Ebbw Vale.....Lewis, Thos. Vaughan
Edinburgh .....Blanshard, Thomas
Ely .....Pate, Henry Thomas
Exeter.....Ash, James Freer
Bromfield, Charles
Knapman, John
Pasmore, George
Sparshatt, H. B. W.
Stone, John
Fakenham .....Barley, Edm. Johnson
Falkirk... .....Murdock, David
Falmouth .....Edmonds, Stephen
Hallamore, John, Jun.
Newman, Walter F.
Foulsham .....Pratt, Richard Munton
Fraserburgh.....Burnett, Robert
Frodsham .....Lewis, James
Gainsborough ...Forrest, Richard W.
Gateshead .....Kendal, John Hinton
Glasgow .....Brown, Thomson
De Bois, Frederick
Mathias, William
Morrison, Adam
Morrison, William
Notman, T. Finlayson
Robertson, Andrew M.
Templeton, John
Glossop .....Macdonald, Robert
Tomlinson, William
Gloucester.....Medd, Joseph
Whinfield, Charles E.
Goole .....Louray, Thomas
Squire, William
Gosport .....Hunter, John
Mumby Charles
Grantham .....Newcome, John
Guildford .....Bidwell, John
Halifax .....Crossley, Smith
Dyer William
Jessop, Jonathan
Ramsden, Alfred
Halstead .....Brown, Alfred James
Haltwhistle .....Smith, James S.
Hammersmith ....Groves, Edward
Harlow .....Wood, John Edward
Hartlepool, West.....Thompson, James
Harrogate .....Coupland, Joseph
Wilson, John
Hartley Wintney.....Kirk, Charles
Hastings .....Norwood, Thomas
Haverfordwest...Williams, William
Hay .....Davies, John L.
Horncastle .....Walter, Joseph
Howden .....Turton, Thomas James
Hull.....Chapman, William Fox
Crowder, C. Hodgson
Gill, Robert John
Hall, Henry R. F.
Hart, Geo. William
Huntingdon .....Ekins, William
Hyde .. ..Wild, Joseph
Hythe (Kent).....Thomas, Richard
Ingatestone .....Stuart, Henry James
Ipswich .....Chapman, Henry
Chapman, William
Fiske, Charles
Goyder, David, Jun.
Ironbridge.....Hartshorn, Thomas
Ironville .....Greaves, Abraham
Jedburgh .....Rawdin, Joseph
Jersey .....Butler, William T.
Ereaut, George
Piquet, John
Wellman, William R.
Keighley .....Kirk, George
Kenilworth .....Hubbard, Robert W.
Keswick ..... .Dobson, James
Kimbolton .....Gudgen, George B.
Kirkwall .....Geddes, John
Knaresbro'.....Gervas, Thomas
Lanark .....Cassells, W. Thompson
Largs .....Fraser, Charles
Leamington .....Williams, John
Leeds .....Atkinson, R. Marshall
Harrison, Thomas
Backhouse, William
Dickinson, J. Bathgate
Garland, William
Jefferson, Peter
Parker, William Henry
Woolley, Moses
Lees, near Oldham.....Marlor, Jabez
Leicester .....Chamberlain, William
Crow, John William
Gammidge, Samuel
Jackson, John
Leigh .....Mansley, Allen
Whittle, Samuel
Leatherhead.....Hewlins, Edward
Leven .....Black, James
Lincoln .....Guilmette, Jas. W.
Pank, William John
Woodcock, Page D.
Liverpool .....Abraham, John
Kirkus, Joel
Allpass, Horace S.
Coupland, Henry
Cross, William Henry
Groom, Wm. Bishop
Hardman, Thomas B.

LIVERPOOL .....Jones, Owen Lewis
Oliver, John
Shield, Spooner
Troughton, James
Warry, Charles S.
Whitehead, John
LONGSIGHT .....Clarke, William
LONGTON .....Gerrard, Joseph
Mercer, Arthur B.
LOUGHBOROUGH ...Adams, John
LOWESTOFT .....Bard, William Fred.
LYME REGIS.....Henley, Henry
MAIDSTONE .....Blott, Daniel
Taylor, Clement
MARCH .....Davies, Peter Hughes
MANCHESTER .....Bateman, John Bird
Booth, Aaron
Cattle, George
Darnborough, Chris.
Foxcroft, Elijah
Hammond, Charles
Hartley, Robert
Hayward, Charles
Heys, Philip Trueman
Ker, Thomas Forster
Kershaw, Joseph
Lowe, Henry Charles
Mather, William
Ransome, Thomas
Rhodes, James
Swindells, Fred. M.
Taylor, Henry
Williams, Edwin
MARGATE .....Dyer, John
MARYPORT .....Cockton, John
MAURITIUS .....Guiot, Emilien
MERTHYR TYDVIL Smyth, Walter
MITCHAM .....Leach, John
MONKWEARMOUTH Brumwell, George M.
MORICE TOWN.....Bath, Richard C.
NANTWICH .....Parton, Joseph
NAILSEA .....Pollard, Wm. Inwood
NARBERTH .....Jones, David
NAYLAND .....Bunn, Charles
NEWBURY.....Pratt, Jonathan B.
NEWCASTLE .....Clennell, John M.
Cooke, Thomas
Nichol, Thomas Dale
Sutton, Francis
Webster, Edwin P.
NEWPORT.....Jones, Thomas Jacob
Morgan, William
Morris, Philip Henry
Phillips, John
NETHER STONY ...Ham, John
NORTHAMPTON .....Barry, Edwin
Barry, James
NORTHWICH .....Facer, William
NORWICH .....Dixon, Benjamin
Hulme, John Hughes
Roope, John Crosse
Smith, Edward
NORWOOD (UPPER)Downes, Joseph
NOTTINGHAM .....Squire, William
Waterall, George E.
White, Frank
Woodward, William
OLDHAM .....Bailey, Spencer
Henthorn, Joshua
Hulme, Thomas
Massey, Joseph
Wild, David
OSWESTRY .....Smale, Richard Bill
PAIGNTON.....Compton, Samuel
PENRITH .....Kirkbride, William
PERSHORE .....Drew, John
PETERBOROUGH ...Buckle, Frank Geo.
PETERHEAD .....Lumsden, James
PILLGWENLLY .....Davies, William H.
PLYMOUTH .....Baker, Eward H.
Giles, Elias
Hensleigh, Henry
Hill, Simon
Hinton, Charles Fox
Reeve, John
Wearing, Wm. Henry
POOLE .....Hamilton, Julius
PONTEFRACT.....Farrer, Charles
PORTSEA .....Bacchus, Moses Piercey
Rastrick, Wm. Henry
PORTSMOUTH .....Childs, Jos. Linington
PRESTON .....Brandreth, John
Dawson, Thomas
Penny, George
Taylor, John Thomas
PRESTWICK .....Horsfield, John M.
RAMSBOTTOM .....Morton, Jamieson
RAMSGATE .....Franks, Alfred
RAWTENSTAL .....Taylor, John
RAYLEIGH .....Harrington, Rich. B.
READING .....Slayter, George
Spokes, Peter
Timothy, Thos. Norris
Withers, John
REDDITCH.....Mousley, William
ROCHDALE .....Barns, Joseph
Lord, Ellis
ROTHBURY .....Farrage, Robert
RUGELEY ..... .Hawkins, Henry Ford
RYDE.....Wavell, John
Woodward, Charles
SALFORD .....Ecroyd, George
Gibson, Robert
Kellett, Henry
Peatson, Henry Robert
Smethurst, Richard L.
SALISBURY .....Atkins, Samuel R.
SCARBOROUGH .....Turner, William
SELBY .....Glew, William
SHEFFIELD .....Ainley, Michael H.
Hawksworth, Henry
Miller, Wm. Henry
Miller, John Thomas
Wilson, Edward

SHELTON .....Brierley, Joseph
SHILDON .....Veitch, William
SITTINGBOURNE ...Rook, Edward
SOUTHAM .....Archer, Thomas
SOUTHAMPTON .....Bartlett, Wm. Hugh
SOUTHEND .....King, Chas. Montague
King, Ellis
SOUTHPORT .....Ashton, William
SOUTHSEA.....Bentham Thomas
SOUTHWELL .....Jones, Wm. Thorpe
SPALDING .....Jones, John
Palethorpe, A. Walter
Shadford, Major
Whelpton, John
SPILSBY.....Brown, Samuel
SPOFFORTH .....Barston, Chas. H.
STALYBRIDGE .....Bagshaw, Hugh
Smith. John Samuel
Sutcliffe, William
Wardle, William H.
Wild, Geo. Wm. H.
STAMFORD .....Hall, Robert
ST. AUSTELL .....Daniel, Henry
ST. COLUMB..... .Geake, John
STEVENAGE .....Fresson, Lewis F.
STIRLING .....Rae, James
ST. IVES .....Young, Tonkin
STONEHAVEN .....Martin, James Foote
STONEHOUSE.....Ferris, James
STROUD.....Niblett, John
SUDBURY .....Harding, James John
SUNDERLAND .....Ashlin, John
Fairley, Thomas
Foster, John
Hopper, Richard
Mitchell, Thomas
Thompson, Robert F.
SURBITON .....Wastuage, Thos. W.
SWANAGE .....Hunt, James
SWANSEA .....Griffiths, William
SWANSEA .....Loveridge, Thomas
TAMWORTH .....Ruffe, Frederick
TAUNTON .....Melhuish, John
Pidgeon, John
Shattock, John
TEIGNMOUTH .....Allis, Francis
THORNE .....Jewison, Robert S.
THORPE LE SOKENCrick, Geo. Edward
TIVERTON.....Bond, Lawrence V.
TODMORDEN .....Chaffer, Robert
Lord, Charles
TORQUAY .....Alderton, John
Fisher, H. Christopher
Narracott, Henry
Webber, Geo. William
TORRINGTON, GreatFowler, Henry
TOTNESS .....Donnall, Geo. Sawle
Rees, James
TOTTENHAM .....Wyatt, Samuel
TREDEGAR .....Crowe, Henry Joseph
TRURO .....Richards, William
TUNBRIDGE WELLSHoward, Richard
TWICKENHAM .....Gough, Wm. Henry
UTTOXETER .....Johnson, J. Borwell
WAKEFIELD .....Wice, Jonathan H.
WARRINGTON .....Redmayne,Christopher
WAVERTREE.....Fingland, James
WEAVERHAM .....Manifold, John
WEDMORE.....Thornton, John
WEDNESBURY .....Forman, George
Horton, Thomas
WESTON-SUPMARE Rich, Thomas
WESTERHAM .....Edgar, James
WELLINGORE .....Ingham, Henry
WHITEHAVEN .....Forster, John
WISBEACH .....Neale, John
WITHAM .....Green, Robert Poynter
WOLVERHAMPTON..Ascough, Jesse
Dowdeswell, Peter
Rooker, Abel
WOODBRIDGE .....Betts, John
WOODSIDE .....Watkinson, Thos.
WORDSLEY ... .Wilshaw, James W.
WORTHING .....Berry, Henry James
Munday, Edw. Smith
WORKINGTON .....Penrice, Joseph, Jun.
YARMOUTH .....Suggate, Henry Ezra
YORK .....Chapman, William
Lupton, Thomas
Pattison, George
Spurr, James
Whittaker, John

MAJOR EXAMINATIONS.

*Barret, Edouard Louis...London
*Bell, Francis .....Wakefield
Biggs, Walter .....Folkestone
*Booth, Alfred.....Warrington
*Breton, Walter .....Margate
*Cleave, Charles Truman Chudleigh
Cuthbert, John Mason ...Cirencester
*Davis, Richard Hayton Kendal
Freeman, William.....Devizes
*Gover, Robert Mundy ...Spalding
Hall, Robert .....Leamington
Heming, Robert. .....Margate
*James, William Albert {Walton-on-Thames
Jennin gs, John Edgell...Bath
*Kirk, John .....Leicester
Lawrence, W. Pierpoint Macclesfield
*Orton, Richard J. W. ...Brighton
Place, William T. .....Knaresboro'
*Pring, Walter .....Taunton
*Sirett, George Beynon ...Buckingham
*Steel, Henry ....Chatham
Steward, Alfred.....Yarmouth
Stroud, John .....Crediton
Vizer, Edwin Bennett ...Ledbury
*Williamson, David ..... Brighton
*Yarde, Giles .....London

MINOR EXAMINATIONS.

*Brown, Allan M'Laren...Brighton	*Searby, William Martin Guildford
Chudleigh, N. Major.....Bovey Tracey	Simpson, Thomas .....Walsall
*Heelas, Henry Martin ...Southampton	*Smeeton, George Henry Birmingham
Radermacher, Charles J. Glastonbury	Williams, J. Thompson Carmarthen

* Honorary Certificates.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH.	TOWNS.
Aldridge, William	Mr. Tylee	Bath
Atkinson, George John	Mr. Wilson	Harrowgate
Bamber, Henry K	Mr. Tanner	Exeter
Buzzard, Thomas H.	Mr. Rainey	Spilsby
Cannon, John A.	Mr. Burden	London
Cook, John	Mr. Pratt	Bradford
Cooper, George	Mr. Spouncer	Gainsborough
Douglas, James	Mr. Broadwater	Amersham
Eddowes, Ralph	Mr. Fowke	Stafford
Evans, Edward	Mr. Bancroft	Ruthin
Evans, William	Mr. Ferris	Bristol
Gething, William	Mr. Tomlinson	Lincoln
Hayward, Charles	Mr. Tomlinson	Lincoln
Hora, Tudor	Mr. Burden	London
Hudson, John H.	Mr. Welborne	Boughton
Johnson, Joseph	Mr. M'Dougall	London
Leslie, Lawrence H.	Mr. Taylor	Shields, North
Macknight, Joseph	Mr. Clark	Durham
Nicholson, Frederick	Mr. Watts	London
Rickards, Edwin	Mr. Grieves	Ludlow
Roberts, John Hall	Mr. Pratt	Leamington
Simpson, Charles C.	Mr. Goodall	Derby
Taylor, Samuel	Mr. Tonge	York
Tollinton, Richard B.	Mr. Jackson	Stowmarket
Ward, Charles Parker	Mr. Gay	Stroud
Webster, John	Mr. Richmond	Leicester
Wood, Edwin B.	Mr. Gardner	Guildford

PHYTOLOGICAL CLUB.

17, *Bloomsbury Square, July* 4.

ROBERT BENTLEY, ESQ., F.L.S., &C., PRESIDENT, IN THE CHAIR.

A DONATION of British plants from Mr. Braithwaite was announced; also a capsule of a species of gossypium, from Mr. J. Fordham, Jun.

The PRESIDENT presented some specimens of the *Anacharis Alsinastrum* in flower, taken from the lake in the Royal Botanic Gardens, Regent's Park. He observed, with regard to this water plant, that it had only become known to botanists as an inhabitant of this country, during the last five years, having probably been originally introduced with some timber from America, as it was common in this part of the world. Since that period it had spread rapidly and extensively throughout the rivers and canals in various parts of the country, and threatened ultimately, unless its increase was stopped, to interfere materially with the inland navigation of the kingdom. In order to illustrate the rapidity of its increase, Mr. Bentley stated that about three years since a plant accidentally found its way into the lake in the Gardens of the Royal Botanic Society. This had multiplied to such an extent that at the present time there was scarcely a portion of the lake to be found which was not densely matted with it. As the female flowers were alone known in this country this increase is extraordinary, as it must take place almost entirely by the formation of buds in the axils of its leaves, each being capable of forming an independent plant when separated from its parent. Every fragment, therefore, into which this plant might be readily divided was capable of developing a new one, so that like that pest of the agriculturist, the common couch grass, the more it was disturbed and cut up into pieces the more rapidly it spread, as by such means the separated portions were

only placed in more favourable circumstances for their propagation; and hence also the difficulty—indeed, the almost impossibility—of eradicating it from those places in which it had once become established. Mr. Bentley, therefore, particularly cautioned botanists to be very careful not to introduce it into any waters where its increase might be attended with injurious results. Mr. Bentley also exhibited the following specimens:—

1. A leaf-bearing branch and the fruit of the *Myrospermum of Sonsonate*. He stated that this plant had been fully described by the late Dr. Pereira, in the tenth volume of the Pharmaceutical Journal, as one of the sources of the *common black balsam of Peru, the white balsam, and balsamito*. The specimens shown by Mr. Bentley were obtained from the same source as those of Dr. Pereira, namely, from Mr. Skinner, to whom botanists and pharmaceutists were under great obligations, for the trouble he was always ready to take to facilitate their investigations.

2. The spadix with flowers and fruit of the *Colocasia odora*. The leaves of this plant and those of allied species, although very acrid when fresh (like most of the plants of the natural order Araceæ, to which they belong), when boiled are commonly eaten in some tropical countries, and from their corms a nutritious soup is prepared.

3. The flowering stem and fruit of *Thalia dealbata*, Nat. Ord. Marantaceæ. The two latter specimens were obtained from the Royal Botanic Gardens.

4. A portion of *Hydrodictyon utriculatum*, under the microscope.

The following paper was then read:—

ON PORTLAND ARROW-ROOT.

BY MR. T. B. GROVES.

In the course of lectures on Materia Medica at the Pharmaceutical Society, delivered in the session 1850-51, by our late much-lamented Professor, Dr. Pereira, he mentioned some facts relative to the manufacture of *Portland Arrow-root*, which led me to infer, that he considered it was carried on to a considerable extent by the inhabitants of the Isle of Portland. Living within a short distance of the island, I have thought it desirable to make some inquiries to ascertain to what extent it is carried on at the present time. Dr. Pereira probably derived his information principally from an article in the Transactions of the Society of Arts, vol. xv. (1797), in which it is stated, that in the year 1797 the gold medal of the Society was awarded to Mrs. Jane Gibbs, of Portland, for producing a sample of starch fit for economic purposes, from materials unfit for the food of man. The *starch*, or *arrow-root*, as it is usually called, was prepared by her by crushing in a mortar the corms of the *Arum maculatum*, stirring the mass with water, and straining off the liquors, from which the fecula was allowed to subside; this was again washed, and then dried. She stated, and the statement is confirmed by the then Rector of the island, that she had in her possession two cwt. of the starch, and was ready to supply any quantity of the same whenever required, at the price of 11*d.* per lb. Although there is no doubt that the quantity of the starch manufactured was much greater at that time than the present, yet its manufacture was never of much importance; it is now almost extinct, and the arrow-root never seen out of the island except in the hands of the curious. From my inquiries I have learned, that many years ago it was customary to crop the land only every other year, allowing it to remain fallow in the intervening period, and that in the fallow fields leave was given to the inhabitants to dig for the roots. This custom has been abandoned, and the usual system of rotation of crops introduced. The common, too, has of late years been much infringed upon by the Government for public purposes, and also by speculators for quarrying for stone. These causes have very much interfered with its manufacture, so much so indeed, that a few years since, wishing to procure a sample for a friend, to illustrate a lecture on dietetic articles, I found it very difficult to obtain even half a pound of it. Within the last week I have ascertained that one old woman is the only person who now prepares any, and she gives as her reason for doing so, that "poor folks now-a-day are glad to turn an honest penny anyhow." At the present time the *Arum* is not very plentiful in the island, although there is still a vast extent of land that will never admit of cultivation on account of its stony character, which, doubtless, produces most of the small quantity now obtained. With the exception of the old woman previously mentioned, liberty is not now obtained to dig in the cultivated fields and pastures.

The *Arum maculatum* is commonly called *arrow-root* or *starch-root*, but the vulgar names *cows and calves*, and *lords and ladies*, are also known, though not so frequently

used. The proper season for collecting the corms is when the plant has perfected its growth. This is generally in the months of May and June. Those which are collected in May yield a much less proportion of starch than those collected later. The fresh corm is extremely acrid, producing a most disagreeable tingling and pricking sensation in the mouth, when chewed. This acridity I found was not completely removed by toasting. Lindley states that the corms are edible when deprived of their acridity by boiling, but I have never known them so used. This acridity renders it necessary to bruise the corms in a stone mortar, and to avoid, as much as possible, handling them until after they have been washed. The process now employed for the separation of the fecula is the same as that described by Mrs. Gibbs. The corms yield, according to Mrs. Gibbs, four pounds of fecula to the peck. My informant tells me she obtains on an average three pounds from a peck of corm, more in June, less in May. During the whole season she considers three dozen pounds to be a good average quantity to obtain, and for this she asks 1*s.* 4*d.* per pound. It is highly valued by the Portlanders, who say that it is good for sick people, and looks, when prepared, very different from the *arrow-root* of the shops. I have compared it with *Bermuda Arrow-root*, and find that it does not make either so clear or firm a jelly, but is perfectly inodorous, tasteless, and destitute of colour. The granules, when viewed under the microscope, appear of an irregular spherical shape, varying much in size, but are on an average much smaller than ordinary starches, except rice starch. The hilum is not very distinctly marked, appearing plainly only in the larger granules.

The *Portland Arrow-root* is, I believe, only made in the Isle of Portland; although there is an abundance of the *Arum* in some of the commons near Weymouth, yet the country people do not appear to know that it is of any use. This will, doubtless, appear strange to those unacquainted with Portland, but when we consider that until within a few years the Portlanders have kept themselves as much as possible aloof from the rest of the world, even forsaking their friends who dared to marry out of the island, and not permitting a stranger to settle amongst them, we can no longer wonder that they have kept their knowledge to themselves. They are probably a race of entirely distinct origin from the inhabitants of the main land; even now they use words which are not understood by us. This *arrow-root* has been prepared by them from time immemorial; and it is very probable, that living on a barren island and depending principally on fish, they may have been compelled by necessity at some time to seek subsistence by preparing the corms for food.

It is a singular fact, that the plant is called *arrow-root* by the islanders, perhaps from its sagittate leaves. May not the *Maranta arundinacea* have derived its English name from the previously known and appreciated *arrow-root* of the Isle of Portland?

Specimens of the *Portland arrow-root*, and some fresh corms of the *Arum maculatum*, sent by Mr. Groves, were laid upon the table.

The President thought that it was much more probable that the name Arrow-root, as applied to the fecula obtained from the *Maranta arundinacea*, was derived from the circumstance of the pulp of its root having been formerly applied by the natives of the West India Islands to wounds inflicted by poisoned arrows.

Mr. Penney then read an interesting paper on "The Place which Botany should occupy in the Studies of the Pharmaceutist."

At the conclusion of Mr. Penney's paper, the President said, that as this was the last meeting of the session he could not but congratulate the Members upon the great success which had hitherto attended them. He hoped during the recess that those Members who visited the country would remember that one of the leading objects of the Phytological Club was the formation of a Herbarium of British plants, and that they would accordingly do all in their power, not only to collect plants themselves in order to present to the Club, but also urge their friends to do the same, by which means he trusted, when they met again in October, the Curator would be able to announce a long list of donations.

Mr. Bentley also took this opportunity of again urging on the Members the great importance of paying particular attention to the effects of climate, &c., on the medicinal activity of plants. Observations on this matter were much wanted, and he hoped soon that some of the Country Members would furnish a paper on this subject, as they alone were in a position to investigate it with any probable success.

The President then announced that the next meeting would take place on Monday, October 3rd, at the usual hour.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ACETOUS EXTRACT OF COLCHICUM, P. L., 1851.

BY MR. THOMAS SOUTHALL.

Allow me to call your attention to the form in the present Pharmacopœia for the Acetous Extract of Colchicum. Prepared according to the directions there given, by evaporating the juice (*non defæcatum*), it is so spongy as to be unfit for use; and the quantity produced is so liable to vary, that of three lots I prepared from the same root, one produced a fourteenth, another a seventh, and the other more than a fifth of the weight of the root employed. The difference was occasioned by using a little more or less agitation in separating the juice from the solid part of the bruised root while straining it through calico.

In the experiment which produced the largest quantity of extract, three-fourths of the starch contained in the root might probably exude with the liquor, while in that producing the smallest quantity care was taken to apply pressure so gradually, that as little starch as possible should be pressed out.

The directions of the Pharmacopœia would be less objectionable if they had provided for the starch settling from the liquor, and being added at the end of the process, according to the plan suggested by J. Fordred (*Ph. Journal*, vol. vii., page 261); as in that case the extract would not be pulpy, and the quantity produced would be more moderate. But even then the uncertainty of the amount of starch which exudes with the juice would exist, and it would not be possible to give directions so specific as to ensure an uniform quantity being contained in the extract.

The acetous extract of colchicum, with the starch wholly separated, appears to me an elegant preparation, and the profession have become accustomed to it and to its proper dose; but if from its being rather inconvenient in dispensing, it should be found needful to stiffen it, would it not be better to use an uniform amount of starch, either of wheat or colchicum, or of powdered colchicum root, rather than leave the quantity to the uncertainty of manipulation?

The colchicum root which I have used, freed from the epidermis, contains twenty-one per cent. of starch, and yields, when sliced and dried, twenty-six per cent. of product. There can, therefore, be only five per cent. of solid ingredient besides starch. The root is now in the highest state of perfection, and does not, I believe, contain any sugar, which, when present, is probably derived from the starch through the commencement of the process of decay. The analysis quoted by J. Fordred was made in the autumn, when the root is imperfect, which accounts for the great difference in the proportion of starch then found in it.

The colchicum used was procured from Saltzburg.

[We quite agree with Mr. Southall in the opinion that the starch which subsides in uncertain quantities during the process, spoils the result and makes it indefinite in strength. The extract is best prepared by rejecting the starch altogether. In this state it is always a soft extract, but it is frequently prescribed with other ingredients, which reduce it to the proper consistence, or if requisite, a little liquorice powder answers the purpose. We know that some Chemists act upon the assumption that the rejection of the starch was *intended*, although, according to the literal meaning of the instructions, the whole is to be retained, and a bad, inelegant, and indefinite extract produced.—Ed.]

ADULTERATION OF CITRIC ACID.

BY MR. WILLIAM JACKSON.

A short time since I ordered some citric acid from a wholesale druggist in the country, and on receiving it my attention was attracted by a strong resemblance in its crystalline form to that of *tartaric acid*.

On applying the usual tests I was unable to detect a trace of citric acid, whilst a crystalline precipitate, on the addition of carbonate and acetate of potash, gave unquestionable evidence of the presence of tartaric acid.

The present high price of citric acid offers a strong temptation to adulterate; but I trust none of the Members of our Society could be imposed upon by so palpable a fraud.

The crystals I received were smaller than those in which we usually see tartaric acid, and, to judge from their dampness, had been very recently prepared.

Any comment upon this gross attempt at fraud would be superfluous after the excellent remarks made by Mr. Kendall in the last number of the Pharmaceutical Journal.

Stowmarket, July 15th, 1853.

ADULTERATION OF PULVIS ACACIÆ.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I beg, through the medium of your Journal, to put the Members of the Pharmaceutical Society upon their guard respecting the adulteration of the above article. A gentleman purchased a small quantity for the purpose of forming a solution, and in a few days called again and said that it had not half dissolved. I requested him to send me the undissolved part for examination, when I immediately found, by testing it with tincture of iodine, that it contained starch, as it immediately imparted an intense blue colour to the mass. I then found, by further experiments, that it yielded twenty-five per cent. of starch. I must not forget to state that I had not an opportunity of seeing it in solution previously, as the bottle containing it had not been opened before, for in making the mixture of acacia at other times (*with the powder from other houses*) I always found that it dissolved rapidly. Such a fraud as the above, when the best article is ordered and paid for, is unpardonable.

I am, yours, &c.,

Ruthin, July 20, 1853. J. J. Bancroft.

[We recommend the practice of purchasing the gum whole, and powdering it at home.—Ed.]

ON THE MANUFACTURE OF AMMONIA AND AMMONIACAL SALTS.

(*Continued from page* 31.)

Ammonia from the Ammoniacal Waters of Coal Gas-works.—The chief source whence ammonia is now obtained, is the ammoniacal waters produced in the distillation of coal, as performed at gas-works. A great number of processes have been devised for the purpose of obtaining ammonia and ammoniacal salts from these waters in the most convenient and economical way, the principal of which we now proceed to notice. As most of these processes have for their object the obtaining of more than one of these salts, we have found it preferable to describe them in the order of priority of invention, rather than under the head of each particular salt. Mr. Ledsom took out a patent, March 2nd, 1827, for improvements in the manufacture of muriate of ammonia. In this process, a quantity of the ammoniacal liquor obtained from the distillation of coal is converted into muriate of ammonia by saturating it with muriatic acid. When this has been done, the liquor is to be evaporated and the salt reduced to a crystalline state. The crystals are then to be dissolved in water, and lime added to the liquor in the proportion of fifty pounds of lime to 100 pounds of muriate of ammonia. The gas passed off from the retort in the process of distillation, having been conducted through water for the purpose of cooling it and separating the tar, is now to be passed through this liquor, when the sulphuretted hydrogen which it contains, uniting with the ammonia, for which it has a great affinity, becomes soluble in the water, and remains principally in the purifier. But if any portion of the sulphuretted hydrogen happens to pass over, it is arrested by another vessel of water containing the mixture above described.

When the muriate of ammonia in the liquor has become spent, the liquor is to be drawn off from the purifier, and a fresh supply introduced, and the spent liquors may be restored by another quantity of muriatic acid. Messrs. Midgley and Kyan patented, November 4, 1837, the following process for obtaining ammoniacal salts, and at the same time preventing the usual nuisance arising from the vapours evolved from manufactories when the ammonia is extracted from ammoniacal liquor according to the modes of manufacturing it previously in use. For this purpose, the patentees submit the ammoniacal liquor to the action of lime, in the following manner:—To every 500 gallons of the liquor they add 250 lbs. of quick-lime, slacked with a sufficient quantity of water. This is poured on to a grating, which is employed for the purpose of preventing large pieces from passing through, and is kept well agitated. It is then placed in a still, in which it is heated to from 170° to 200° Fahr. The ammonia thus becomes evolved, and is thence passed into acid by which salts are formed, which are obtained in solution. When the ammonia is worked off, the residuum is cleared out and a fresh charge put in. Mr. William Watson took out a patent, November 8, 1838, for improvements in the manufacture of liquid ammonia applicable to the purposes of dyeing, scouring, and other manufacturing processes. "In this process," states the patentee, "which I have invented, I manufacture the liquid ammonia from gas-water, and I dispense entirely with the use of sulphuric or muriatic acid, and of course with the evaporation and crystallization. I make it in the following manner:—The gas-liquor, or gas-water, I put into a retort or any other suitable vessel, along with fresh slaked lime, the quantity of which is to be determined by the quality of the water; by the application of heat, a tolerably pure liquid ammonia is disengaged, which, being passed into water, forms a solution of ammonia. When this distillation has been carried so far that a considerable portion of steam or the vapour of water proceeds from the retort along with the ammonia, the ammoniacal solution, already formed, is to be removed—this I call the first portion; and what is collected afterwards by a continuation of the process, I call the second portion; and, being very impure, it is put back into the retort with the mixed charge of gas-water. The first portion must be again submitted to distillation, with or without a small quantity of lime, and the same precaution must be observed as before, that is, so long as the principal part of what proceeds from the retort or boilers is ammoniacal gas, it must be passed into water; and when this ceases to be the case, as by continuing the heat the water as well as the ammonia will evaporate, the solution of ammonia already formed, must be removed. This may be called the first portion of the second distillation. The process may be continued then until all or nearly all of the ammonia is distilled; this second portion is to be returned as before to the retort. The first portion of this second distillation is a solution of ammonia, sufficiently pure for common purposes; but it may be still further purified by distilling it a third time in the same manner as before, preserving that portion only which is made by the absorption of the ammoniacal gas in water, and returning to the retort the latter products of the process, which consist of ammonia and water mixed with impurities." Mr. Croll's process (patented July 29th, 1840) for obtaining the salts of ammonia, are of two kinds: in one of these dilute sulphuric or muriatic acid is employed to abstract the ammonia from the gas, and in the other the chloride and sulphate of manganese and muriate of iron are employed for the same purpose. In the latter case a vessel used in the manufacture of gas for holding wet lime for the purposes of gas purifying, is filled with a solution composed of 1 cwt. of chloride of manganese to forty gallons of water, and the gas is forced through this solution in the usual way by the pressure of the retorts, by which means the ammonia is absorbed. As soon as this solution is saturated with ammonia, it is drawn off, and the vessel fresh charged. Sulphate of manganese and muriate of iron may also be employed in the same way to absorb the ammonia produced in the manufacture of coal-gas.

In the case of using sulphuric acid, a vessel more commonly employed for washing gas is filled with a solution composed of 100 gallons of water to two pounds and a half of sulphuric acid, spec. grav. 1.845, and the gas is passed through it as usual until it has attained the spec. grav. of 1.170, and is saturated with ammonia; it is then drawn off and the vessel charged anew.

When muriatic acid is used it is applied in the same manner, as regards proportion, the acid being of spec. grav. 1.165 before it is mixed with the water: the solution of muriate of ammonia is to be drawn off when it has acquired a density of

1.176. In order to obtain the ammoniacal salts (when a salt has been used for purification), the insoluble part of the mixture is allowed to settle, and the clear liquor, which contains muriate of ammonia and sulphate of soda, is drawn off. These must be separated from each other, either by crystallizing the salts of ammonia from that of soda, or by evaporating both to dryness, and subliming the ammoniacal salt. If an acid be employed it is only necessary to evaporate the ammoniacal solution. The salts formed by the use of the chloride of manganese and salts of zinc, may be obtained by the same means.

Mr. Croll thus describes his peculiar mode of manufacturing or reproducing the salts by the double decomposition of salt and the residuum and precipitates of chloride of manganese:—To twelve ounces of the dry precipitate, add one pound of common salt, mix them intimately together, and submit them, in a suitable furnace, to a heat scarcely perceptible in the dark, for two or three hours; then to 140 pounds of this mixture add forty gallons of water. It is then fit to be used for purifying gas from ammonia, and the residuum which the gas leaves in passing through it is to be heated in like manner. The insoluble part of the solution before mentioned may be brought to its original state by dissolving it in the acid forming one of its constituents or dissolving it in sulphuric or muriatic acid, by which means a sulphate or muriate of ammonia is obtained. In Mr. Waterton's patent, dated August 27, 1840, for the manufacture of muriate of ammonia, two methods of effecting the proposed object are there described. The first consists in making a saturated solution of common salt in water, and mixing with it a quantity of finely pulverized carbonate of ammonia, about equal in weight to the salt contained in the solution. The mixture is agitated in a close vessel for six or eight hours, and as much carbonic acid gas is passed therein as it will absorb (but the introduction of this gas is not absolutely necessary, although the patentee prefers it), the liquid is then separated from the solid matter by filtration and pressure. The solid matter is chiefly bicarbonate of soda, and the liquid holds in solution muriate and carbonate of ammonia and common salt, and sometimes a small portion of the bicarbonate of soda.

The liquid is now placed in a distilling vessel, and the carbonate of ammonia being distilled over into a suitable receiver, a solution of muriate of ammonia and common salt remains in the still. This solution is evaporated by heat to such a consistency as will cause the separation of the common salt by crystallization, and the salt thus crystallized is separated from the liquid by any convenient method. The liquid is then evaporated until it attains the proper specific gravity for crystallizing, and it is transferred into suitable vessels for that purpose. The crystals produced by these means are nearly pure muriate of ammonia, and when pressed and dried, may be brought into the market without further purification, or they may be sublimed into sal ammoniac.

The other mode of manufacturing sal ammoniac consists in taking a quantity of liquid containing ammonia, either in the caustic state or combined with carbonic, hydrosulphuric, and hydrocyanic acids (as in the case of the ammoniacal liquor of the gas works), and rectifying it by distillation until the distilled portion contains from twenty to twenty-five per cent. of carbonate of ammonia. If the liquid contain any other acids than those above mentioned, a sufficient quantity of lime is used in the distillation to decompose the ammoniacal salt. The distilled liquid being now mixed with as large a quantity of powdered common salt as it will dissolve, is agitated for several hours, and as much carbonic acid gas is passed into it as it will absorb. The remainder of the operation is the same as before described in the first method of manufacturing muriate of ammonia.

In 1841 Mr. Laming took out a patent for manufacturing carbonate of ammonia by mixing together its separate acid and alkaline constituents instead of by the decomposition of an ammoniacal salt. One of the processes used, is to cause ammonia and carbonic acid gas, obtained separately from any convenient sources, to traverse a succession of leaden chambers, maintained at as cool a temperature as may be conveniently practicable, and so contrived as to favour the admixture of the dissimilar gases. In this process it is not essential that the two gases be present in their combining proportions; it is preferable that the carbonic acid be in greater abundance than will combine with the ammonia which is present. Sometimes a stratum of water, or of water impregnated with ammonia, is placed in one or more of the leaden chambers, and carbonic acid and ammonia in the form of gas are then introduced; in which case, it is stated, a larger proportion

of carbonic acid gas is found in the resulting salt or saline solution than when only the hygrometric moisture of the aëriform fluids is present. In Mr. Astley's process of manufacturing muriate of ammonia, the bittern or muriate of magnesia, obtained from the sea-salt works, was employed as the source of muriatic acid, and the parings of skins, horns, and other animal matters, furnished the ammonia. The animal matters were saturated with the bittern in stone-rooms heated by brick flues, and being afterwards subjected to a red heat in a close kiln, muriate of ammonia was obtained.

A valuable improvement in the mode of obtaining ammonia from ammoniacal solutions was patented in the name of Mr. W. E. Newton, patent agent, November 9, 1841. The real patentee, we believe, was Mr. Laming, of Clichy Chemical Works, near Paris. This improvement consisted in the application of the well-known still, invented by Mr. Coffey for the distillation of spirit, to the production of ammonia, either pure or more or less impure, according to the purpose for which it is required, from any liquid, from which, by the agency of steam, it may be eliminated, either alone or in conjunction with vapour, carbonic acid, or other volatile matters, the presence of which do not prevent the application of ammonia to one or more useful purposes.

This apparatus or ammonia still is an upright vessel, divided by horizontal diaphragms or partitions into a number of chambers. It is proposed to construct the vessel of wood, lined with lead, and the diaphragms of sheet iron. Each diaphragm is perforated with many small holes, so regulated, both with regard to number and size, as to afford, under some pressure, passage for the elastic vapours which ascend, during the use of the apparatus, to make their exit by a pipe opening from the upper chamber. Fitted to each diaphragm are several small valves, so weighted as to rise whenever elastic vapours accumulate under them in such quantity as to exert more than a certain amount of pressure on the diaphragm. A pipe also is attached to each diaphragm, passing from about an inch above its upper surface to near the bottom of a cup or small reservoir, fixed to the upper surface of the diaphragms next underneath. This pipe is sufficiently large to transmit freely downwards the whole of the liquid which enters for distillation at the upper part of the upright vessel, and the cup or reservoir, into which the pipe dips, forms, when full of liquid, a trap, by which the upward passage of elastic vapours, by the pipe, is prevented. The vessel may rest on a close cistern, contrived to receive the descending liquid as it leaves the lowest chamber, and from this cistern it may be run off, by a valve or cock, whenever expedient. The cistern, or in its absence the lowest chamber, contains the orifice of a pipe, which supplies steam for working the apparatus. The exact number of chambers into which the upright vessel is divided is not of essential importance ; but the quantity of liquid and the surface of each diaphragm being given, the distillation within certain limits, will be more complete, the greater the number of chambers used in the process. The liquid, undergoing distillation in this apparatus, necessarily covers the upper surface of each diaphragm to the depth of about an inch, being prevented from passing downward through the small perforations by the upward pressure of the rising steam and other elastic vapours ; and on the other hand, the steam being prevented, by the traps, from passing upwards, by the pipes, is forced to ascend by the perforations in the diaphragms ; so that the liquid, lying on them, becomes heated, and in consequence gives off its volatile matters. When the ammoniacal liquid accumulates on one of the diaphragms, to the depth of an inch, it flows over one of the short pipes into the trap below, from whence it overflows into the next diaphragm, and so on.

The management of the apparatus varies in some measure with the form in which it is desirable to obtain the ammonia. When the ammonia is required to leave the upper chamber, in the form of gas, either pure or impure, it is necessary that the steam which ascends, and the current of ammoniacal liquid which descends, be in such relative proportions that the latter remain at or near the atmospheric temperature, during its passage through some of the upper chambers, becoming progressively hotter as it descends, until it reaches the boiling temperature ; in which state it passes through the lower chambers, either to make its escape, or to enter a cistern provided to receive it, and in which it may for some time be maintained at a boiling heat. On the contrary, if the ammonia, either pure or impure, be required to leave the upper chamber, in combination with the vapour of water, the supply of

steam entering below must bear such proportion to that of the ammoniacal liquid supplied above, that the latter may be at a boiling temperature in the upper part of the apparatus.

Solutions of ammoniacal salts, which have had their respective acids abstracted by any of the usual means, afford, by being thus treated, ammoniacal gas, either alone or in combination with water, of considerable purity; but the apparatus is equally serviceable in obtaining similar results, more or less impure, from the ammoniacal waters obtained by the distillation of coals, or of bones, or other animal matters, as well as from stale urine. Acids and certain other matters, contained in these impure liquids, may first be partly removed by lime and other well-known means; and some of them will be further removed during the passage of the ammonia through the apparatus, care being taken to use them so dilute, that the vapour, which escapes with them, shall be sufficient in quantity to prevent the solidification of the ammonia, by the carbonic acid which rises with it, and the consequent obstruction of the passages. Instead of being furnished with perforations, valves, and pipes, the diaphragms may have plain surfaces, and each be bent upwards at one of its sides, so as not entirely to separate the contiguous chambers. The diaphragms should be bent upwards at opposite sides alternately, thereby permitting the descending fluid to fall as a cascade from the right hand side of one diaphragm on to the next below; and then from the left hand side of that one on to the next in succession, and so on until the whole of the diaphragms are occupied with liquid. In this case the liquid will be heated by the contact of the ascending steam sweeping over its extensive surface; and also by the steam acting on the under sides of the diaphragms on which the liquid rests.

Mr. Philippi's process for obtaining ammoniacal salts, as patented by him, July 21, 1842, is that of decomposing the ammoniacal water of the gas-works by means of sulphate or chloride of manganese, the gas being passed through the solutions contained in suitable cisterns or apparatus. Mr. Philippi also describes an arrangement of apparatus suitable for obtaining ammonia and ammoniacal salts from gas liquor. For this purpose the gas liquor is acted upon by lime in a common distilling apparatus, heated either by steam or otherwise, by means of a worm or injection; the ammonia set at liberty by the heat escapes into a second boiler similar to the first one through a connecting pipe—the condensing of the ammoniacal vapours heats the second boiler, in which there are lime and ammoniacal waters. A third boiler is employed with the same effect, after which there is a leaden worm, in which the vapours circulate. This worm is surrounded by cold ammoniacal water, and descends into a leaden vessel, in which is deposited a solution of alkali, which at first is very strong, but becomes weaker as the distillation goes on. The alkali is withdrawn before it descends below 220°, but as a part of the ammonia is in a gaseous state, there are two other vessels prepared after the first one, the whole forming a Woulfe's apparatus. The solution of lime of the second vessel, which is not saturated after one distillation, is put into the second boiler, that the lime and ammonia which are dissolved in the liquid may be used. If muriate, sulphate or carbonate of ammonia be required, the vapours may be condensed in suitable vessels containing muriatic, sulphuric, or carbonic acids.

For the purpose of obtaining ammonia sufficiently pure for many purposes in the arts from gas water, Mr. Laming patented, July 13, 1843, the substitution of a solution of muriate of lime for the mineral acids usually employed. This process is as follows: he first mixes with gas water a sufficient quantity of muriate of lime in solution to convert the carbonate of ammonia, which is present, into muriate of ammonia, and, after having separated the carbonate of lime which forms, the remaining solution is exposed for an hour to a boiling temperature. This solution, after having been cooled, is first agitated with enough hydrated oxide of iron to combine with all its sulphuretted hydrogen; secondly, with lime enough to saturate the muriatic acid which is present; and, finally, it is distilled. The ammonia will be found in the water which comes over, in a tolerably pure state.

In Watson's patent of January 16, 1844, the following description of apparatus for manufacturing sulphate of ammonia is given. An iron boiler capable of holding a charge of about 260 gallons of ammoniacal gas liquor is provided, furnished with a bent pipe or tube, connecting the boiler with a leaden vessel open at the top. Into the boiler a quantity of slaked lime may be placed with the ammoniacal liquor, which has the effect of hastening the operation, and producing a salt of a purer

quality. The leaden vessel is partly filled with sulphuric acid (if sulphate of ammonia be required) in the proportion of about one pound weight of sulphuric acid, sp. gr. 1.700 to every gallon of water. This acid must be diluted with from three to four times its weight of water. When heat is applied to the boiler, the ammonia is driven off, and in coming into contact with the acid in the leaden vessel combines with it with the formation of solution of sulphate of ammonia, which is afterwards drawn off and crystallized. By the use of muriatic acid on muriate of lime, a solution of muriate of ammonia may be obtained.

Johnson's process (patented 1845) for obtaining sulphate of ammonia, is to put the ammoniacal liquor of the gas-works into a boiler similar to a steam-engine boiler, having a pipe passing from the top into a vessel containing a solution of alkali, lime, or of sulphate of iron or manganese, into which the pipe dips; another pipe passes from the top of this vessel to the bottom of a second, containing dilute sulphuric acid. The liquor being put into the boiler, heat is applied, and the hydrosulphate of ammonia, being the most volatile of the salts contained in the liquor, passes over; first its hydrosulphuric acid is absorbed by the contents of the first vessel, and the ammonia by the acid contained in the second vessel with the formation of sulphate of ammonia. After the hydrosulphate of ammonia has all passed over, the liquor remaining in the boiler may be drawn off and neutralized in the usual way with sulphuric acid. Or, muriatic acid may be substituted for sulphuric acid, and thus muriate of ammonia may be obtained.

Mr. Johnson patented, December 20, 1845, a method of obtaining ammoniacal salts, by passing coal-gas in its way from the retorts to the gasometer, through vessels containing certain metallic salts, such as sulphate of iron as the cheapest, previously pounded very fine, and moistened with just enough water to bring the pulverized salt to a pasty consistency. Sulphate of ammonia is thus obtained.

Mr. Hills patented, August 11, 1846, the following processes relative to the manufacture of ammoniacal salts. To obtain muriate of ammonia he employs muriate of magnesia, which he either mixes in the state of powder with the coal in the manufacture of gas, or he puts it in a small iron vessel placed within the same retort, or when several retorts are used at the same time, one retort may be used to contain the muriate of magnesia alone; in either case the muriatic acid liberated from the decomposition of the muriate of magnesia by means of heat combines with the ammonia to form muriate of ammonia which is collected in the ammoniacal liquor.

In the same patent Mr. Hills describes his improved apparatus for obtaining ammonia from ammoniacal liquors. This apparatus is similar in construction to a condenser which is in common use for the distillation of alcohol, and which in form is a four-sided vessel, furnished with shallow pans fixed to the alternate sides. The ammoniacal liquor flows through pipes placed under the upper shelves or pans, thus keeping them cool whilst itself receives an accession of heat, and then flows into the top pan of the lower series. When this top pan is full, the liquor flows over into the next of the series, and so on to the bottom. The pans in the lower series are kept hot by pipes, which pass under them in a zig-zag form, through which pipes hot water, steam, or hot air circulates. The liquor, in passing through this apparatus, has its ammonia sublimed into the upper part, the water running out by a pipe at the bottom.

(*To be continued.*)

ON THE PREPARATION OF COLLODION WOOL OR GUN-COTTON.

BY C. MANN.

During the last few months numerous statements have been made with regard to the preparation of collodion wool, from the general results of which it appears that in adopting the several methods certain proportions of the reagents must be strictly adhered to, although, frequently, these proportions are not even mentioned in the directions given.

The author of the present paper has made a series of experiments, with a view to determine what are the conditions that determine the good or bad quality of this substance. He finds that this very much depends upon the percentage of water in the sulphuric and nitric acids. In proportion as the quantity of water in the mixture exceeds a certain normal, either the collodion wool is bad or none is formed Very concentrated sulphuric acid yields a product which, though good

while in a fresh state, decomposes even at the ordinary temperature; more dilute acid, on the contrary, yields a worthless product. Neither of these products dissolve in a mixture of alcohol and ether. According to the state of hydration of the acid, the cotton may be obtained of different characters, varying gradually from an extremely soluble form to one which is equally insoluble. When, by the use of too concentrated sulphuric acid, an insoluble wool has been obtained, this may easily be rendered soluble by steeping it in the proper mixture of acid, and inversely good collodion wool may be rendered insoluble. Thus, for instance, cotton treated with a mixture of fourteen parts 3 (SO_3 HO)+HO, and twelve parts NO_5 HO, yields an insoluble product, which, when steeped in the mixture of fourteen parts $(HO)_3$ SO_3 and twelve parts NO_5 HO is converted into soluble collodion wool. As a general rule, the conditions which determine the quality of the product, are, 1. The hydration of the sulphuric acid; 2. The presence of a certain quantity of hyponitrous acid in the nitric acid; 3. The temperature; and 4. The time of steeping.

The process which the author adopts is the following:—Sulphuric acid of from 1.830 to 1.835 specific gravity, that is, of ninety-four per cent. of monohydrate, according to Ure=65°.5 Baumé, at 59°.9 F., and represented by the formula 3 (SO_3 HO)+HO is mixed with nitrate of potash and cotton wool, neither of which require to be dried, in the following proportions:—

A 1 part cotton wool
31 parts 3 (SO_3 HO)+HO equiv.=156
20 parts KO NO_5 equiv.=101

The powdered nitrate is mixed with the sulphuric acid in a glass cylinder, the mixture stirred until the nitrate is entirely dissolved. Into this mixture while still warm, but not at all more than 122° Fah., the cotton wool is introduced and agitated with a rod until perfectly saturated with the acid liquid. The cylinder is then to be covered with a glass plate, and the whole left to stand for about twenty-four hours at a temperature of 84.4° or 86° F. The mixture is then placed in a porcelain mortar, and washed with cold water, until the wool has no longer an acid reaction. The moist wool is finally freed, by treatment with boiling water, from the last traces of sulphate of potash, which is very obstinately retained by the cotton fibres, and communicates to the collodion solution an opalescent appearance.

When the cotton wool is allowed to remain for five or six days in the mixture at a temperature of 86° F. the collodion wool is improved in quality. When the steeping is continued only for ten or twenty minutes, the product is less perfect.

Collodion wool may likewise be obtained with nitrate of soda, in which case, however, sulphuric acid of 1.800 sp. gr.=64°.5 Baumé is requisite. This acid may be represented by the formula 3 (SO_3 HO)+2 HO. The proportions to be used are :—

B. $\frac{1}{2}$ part cotton wool
33 parts 3 (SO_3 HO)+2 HO equiv.=165
17 parts Na O NO_5 equiv =85

Other mixtures of sulphuric acid and nitrate of potash or soda may be made, which yield equally good or even better collodion wool when applied to the cotton in different proportions. Thus the author made experiments with the following mixtures :—

C. 2 parts cotton wool
66 parts 2[3(SO_3 HO)+2HO] equiv.=330
20 parts KO NO_5

The sulphuric acid which is used with nitrate of soda, and in which case a double quantity is requisite, must possess a different composition, namely:—

2 [3 (SO_3 HO) + 2 HO] + HO = 3 $(HO)_2$ SO_3 + 3 SO_3 HO + 2 HO.

Further, collodion wool is obtained by using:

D 1 part cotton wool
35 parts 3 $(HO)_2$ SO_3 equiv. = 174 spec. grav. 1.780*
33 parts 3 (SO_3 HO) + 2 HO equiv. = 165
17 parts NaO NO_5

As in the first experiment, this mixture of acid and salt, after standing for twelve hours at the ordinary temperature, produced some slight blackening and solution of the cotton-wool, it appeared probable that the sulphuric acid had not had sufficient time to decompose the nitrate of soda completely. In a subsequent experiment,

* The mixture of the two acids had a specific gravity of 1.790=64° B.

therefore, the author allowed the mixture of acid and salt to stand for twenty-four hours, stirring it frequently. On then introducing the cotton-wool no decolouration took place, and after the mixture had stood for five days at a temperature of 86° F., the collodion wool obtained proved to be of excellent quality.

From the definite states of hydration of the sulphuric acid requisite for the nitrates of potash and soda respectively, it may be seen what must be the state of the sulphuric acid when nitric acid is employed instead of the nitrates in the preparation of collodion wool. The author has ascertained by experiment that among the products of the decomposition of $KO\ NO_5 + 3\ SO_3\ HO + HO$, the member $KO\ 2\ SO_3$ is of no importance in the production of collodion wool, and that this is likewise the case among the products of the decomposition of $NaO\ NO_5 + 3\ SO_3\ HO + 2HO$, with regard to the member $NaO\ SO_3 + SO_3\ HO$. Consequently these may be excluded from consideration, and then the mixtures may be represented by the formulæ

$$SO_3 + NO_5 + 4\ HO, \text{ or } SO_3\ 3\ HO + NO_5 HO,$$

which is the appropriate mixture of acids for preparing collodion wool.

E 1 equiv. SO_3 3 HO spec. grav. = 1.632 = 56° Baumé
1 equiv. NO_5 HO spec. grav. = 1.518 to 1512 = 49.6 to 49.12 B.

yield a mixture which converts cotton-wool into excellent collodion wool.

When the sulphuric acid is more concentrated and the nitric acid more dilute, the quantities to be taken of each so as to have 1 equiv. SO_3 for every equiv. NO_5 and 4 equiv. HO, may be determined by calculation.

For preparing collodion wool with monohydrate of nitric acid, the quantities to be taken are:

F 1 part cotton wool
13 parts SO_3 3 HO equiv. = 67
12 parts NO_5 HO equiv. = 63

Further, when from the mixture of nitrate of potash and sulphuric acid = $KO\ NO_5 + 2\ (3\ SO_3\ HO + 2\ HO)$ the $KO\ 2\ SO_3$ is, as above, disregarded a second prescription for the preparation of collodion wool is obtained. There then remain $4\ SO_3 + NO_5 + 10\ HO$, or $3\ (SO_3\ 2\ HO) + SO_3\ 3\ HO + NO_5\ HO$. The same result is obtained when

$NaO\ SO_3 + SO_3\ HO$ is deducted from $NaO\ NO_5 + 2\ (3\ SO_3\ HO) + 2\ HO + HO$.

According to the formula thence deduced the following quantities must be taken:

G 1 part cotton wool.
33 parts $3\ SO_3\ 2\ HO$
13 parts $SO_3\ 3\ HO$
12 parts $No_5\ HO$

The mixture of the two acids has a sp. gr. of 1.753 or 1.750 = 62° B.

Collodion wool may be prepared both with the nitrates of potash or soda, and in a much shorter time than has been stated above, when the cotton-wool is treated with them for about an hour, at a temperature of 104° or 122° F., and this is likewise the case with a mixture of nitric acid and the double quantity of sulphuric acid. But the mixture of thirteen or fourteen parts SO_3 3 HO and 12 NO_5 HO does not, when the latter acid is very yellow, bear so high a temperature, and not even the ordinary temperature, because the hyponitrous acid generated alters the character of the collodion wool, at least in so far that its solution in a mixture of alcohol and ether gives, when evaporated upon a glass plate, an opalescent layer, and not a transparent one, like good collodion wool. When the monohydrate of nitric acid contains much hyponitrous acid, the layer has a milky appearance, and inversely the collodion layer is clearer and more colourless the smaller the quantity of hyponitrous acid present in the liquid with which it is prepared.

When cotton-wool is treated with the mixture of sulphuric and nitric acids, at the temperature of 32° F., collodion wool is formed, but very slowly and imperfectly. The temperature of 41° or 46.5° F., appears to be the most favourable.

Collodion wool prepared according to any one of the methods above described, and especially that which directly after being washed, is strongly pressed and then freed as much as possible from adhering moisture between bibulous paper, dissolves very readily in a mixture of seven or eight parts of ordinarily pure ether, and one part of absolute alcohol. The solution may be diluted with an equal quantity or even more ether, without any separation of the dissolved substance. The perfectly dry collodion wool dissolves rather slowly in the mixture of alcohol and ether, a character presented more especially by the wool prepared at low temperatures. But when the dry

collodion wool is moistened with water, and then well pressed, it dissolves as readily as when fresh made. The collodion wool which is prepared with mixtures either of nitrate of potash or monohydrated nitric acid, with the so-called single quantity of sulphuric acid, and at a higher temperature is but little dissolved, and for the most part only disintegrated by a mixture of eight parts anhydrous ether and one part absolute alcohol; that prepared with mixtures either of nitric acid, nitrates of potash or soda, with the double quantity of sulphuric acid, and at a temperature of about 86° F. is not even disintegrated by this mixture of ether and alcohol, and appears to be insoluble in it. Ether free from water and alcohol, dissolves scarcely any collodion wool, even when it contains water. The same is the case with absolute alcohol and watery spirit in reference to collodion wool prepared at temperatures much below 104° or 122° F.

The collodion wool prepared with a mixture of thirteen parts SO_3 3 HO + twelve parts NO_5 HO and one or two parts cotton-wool, by digesting for two hours at 104° or 122° F., dissolves in absolute alcohol, and gives a thick, clear solution, like ordinary good collodion solution made with a mixture of ether and alcohol. This alcoholic solution evaporates very slowly, and leaves upon the glass plate a clear, colourless, hard layer.

The mixtures A D F yielded collodion wool, which admitted of being dried at 212° F. without decomposing, and of being kept for years without alteration. The author was unable to arrive at any corresponding results by the analysis of collodion wool which had been purified by means of carbonate of soda.—*Bullet. de St. Petersbourg*, vol. xi., p. 210.

ON THE ANHYDROUS ORGANIC ACIDS.

BY M. DUMAS.

In a former number I have given an abstract of M. Gerhardt's memoir on the organic acids. The importance of the subject induces me now to lay before the readers of that article the report made to the Academy of Sciences, on the 21st of March, 1853, by Pelouze, Regnault, and myself, to whom M. Gerhardt's memoir was referred for examination.

When a salt is decomposed so as to set free its acid, if the operation be effected in the presence of water, the acid is almost always transformed into a hydrate.

Carbonic acid, sulphurous acid, and especially the hydrogen acids, are, undoubtedly, disengaged without combining with water, excepting, that if soluble, they are dissolved, but do not form any distinct, well defined, or stable compounds; but most frequently the opposite result is observed, and the acid seems to have so strong a tendency to combine with water, that it is very difficult or impossible to obtain it in the anhydrous state. Thus, for instance, sulphuric acid and nitric acid were known as hydrates long before they were obtained in the anhydrous state.

Most of the organic acids, unlike carbonic acid, which is disengaged in the anhydrous state, unlike even those acids, such as the sulphuric and nitric, which may more or less easily be rendered anhydrous, were not known in this state. M. Gerhardt, however, has supplied the deficiency which existed in this respect, by furnishing a process by which nearly all the organic acids may be obtained in the anhydrous form.

He has prepared,

1. *Anhydrous Benzoic Acid* ($C_{14}H_5O_3$), in oblique prisms, insoluble in cold water, soluble in alcohol and ether, in which it forms neutral solutions, fusible at 107.6° F., remaining in the fused state in water like a heavy oil, slowly converted into the ordinary acid by boiling water, boiling at 590° F.

2. *Anhydrous Cinnamic Acid* in a crystalline powder, fusible at 260° F., and resembling the preceding in general characters.

3. *Anhydrous Acetic Acid* ($C_4H_3O_3$), a colourless liquid, very mobile, highly refractive, having an odour resembling that of strong acetic acid with that of the hawthorn. Its specific gravity is the same as that of the hydrated acid, 1.073, its boiling point is about 279.5° F. It falls in water like a heavy oil, and dissolves only by the aid of continued agitation and heat. The equivalent of anhydrous acetic acid represents two volumes of vapour.

4. *Anhydrous Butyric Acid* is a highly refractive colourless liquid, lighter than

water. It boils at 320° F. The odour is not disagreeable like that of the hydrated acid, but somewhat resembles that of butyric ether.

The equivalent of anhydrous butyric acid corresponds to two volumes of the vapour.

5. *Anhydrous Valerianic Acid* is colourless, oily, lighter than water, boiling at 419°, slightly odorous, but acquiring as it becomes hydrated the peculiar smell of ordinary valerianic acid.

6. *Anhydrous Salicylic Acid* is a thick oily substance, which solidifies after being kept for some time. It is soluble in alcohol and in ether, and is converted by boiling water into ordinary salicylic acid.

M. Gerhardt has obtained some members of another series of very interesting bodies, which correspond to chlorocarbonic acid. It is known that oxide of carbon and chlorine combine in equal volumes, and that when thus combined they constitute a chloride of oxide of carbon, corresponding to carbonic acid, in which one equivalent of oxygen is replaced by an equivalent of chlorine. In anhydrous acetic acid and the analogous acids, one equivalent of oxygen may be replaced, in like manner, by an equivalent of chlorine, yielding chlorides of compound radicals, analogous to chloride of benzoyle.

The Chloride of Acetyle is a colourless liquid, fuming in moist air, heavier than water, by which it is decomposed, yielding hydrochloric acid and acetic acid. Its formula is ($C_4H_3O_2Cl$.)

The Chloride of Butyrile is also liquid, colourless, heavier than water, fuming slightly in air, and decomposing water immediately. Its formula is ($C_8H_7O_2Cl$.)

M. Gerhardt has also made known a third class of bodies, which are quite new and of great interest, consisting of compounds of the preceding, united in equal equivalents.

In whatever way we may view these last compounds, it is impossible not to be struck with the fact that, whilst the hydrated acids have so little tendency to unite among themselves that we know of but rare and doubtful instances of this kind of combination; the anhydrous acids, on the other hand, have a particular tendency so to combine.

Benzocuminic Acid is composed of one equivalent of anhydrous benzoic acid and one equivalent anhydrous cuminic acid, $C_{14}H_5O_3$, $C_{20}H_{11}O_3$, being $C_{34}H_{16}O_6$. It is oily, heavier than water, decomposable by the bases which transform it into benzoates and cuminates.

Benzocinnamic acid is composed of one equivalent of anhydrous benzoic acid and one equivalent of anhydrous cinnamic acid, $C_{14}H_5O_3$, $C_{18}H_7O_3$, being $C_{32}H_{12}O_6$. It is an oily body which is decomposed by heat.

Acetobenzoic Acid is composed of one equivalent of anhydrous acetic acid, and one equivalent of anhydrous benzoic acid, $C_4H_3O_3$, $C_{14}H_5O_3$, being $C_{18}H_8O_6$. It is oily, heavier than water, possessing an agreeable smell of Spanish wine. Boiling water slowly renders it acid; the alkalis quickly produce acetates and benzoates. Heat causes a complete separation, the acetic acid distilling, and the benzoic being left as a residue.

Acetocuminic acid and *acetocinnamic acid*, present analogous properties to those of the preceding.

The preparation of these different products is easily effected.

Thus, if oxychloride of phosphorus (PO_2, Cl_3) be brought into contact, for example, with benzoate of soda, there are immediately formed phosphate of soda and chloride of benzoyle ($C_{14}H_5O_2Cl$). If, again, chloride of benzoyle be made to react on benzoate of soda, chloride of sodium and anhydrous benzoic acid are produced. So that, in fact, oxychloride of phosphorus, in the presence of excess of benzoate of soda, yields *anhydrous benzoic acid.*

The reaction takes place like a double decomposition between two salts. It is only necessary to add the oxychloride of phosphorus to excess of benzoate of soda, to agitate the mixture, and to wash the product of the reaction with boiling water. This dissolves the excess of benzoate of soda, and the chloride of sodium which is produced, and leaves the anhydrous benzoic acid unaltered, like a heavy oil, at the bottom of the vessel. On cooling it crystallizes.

The chloride of acetyle and anhydrous acetic acid are obtained in the same way.

From what has been stated it might be concluded that chloride of acetyle mixed with benzoate of soda would yield chloride of sodium and anhydrous acetic and

benzoic acids. The two last, being produced in equivalent quantities, unite to form a double acid, Acetobenzoic acid.

If chloride of benzoile be mixed with cinnamate of soda, there will be formed chloride of sodium and a double acid, produced by the union of the anhydrous benzoic and cinnamic acids, Benzocinnamic acid.

Such are the essential facts which have been observed by M. Gerhardt. Most of the experiments described by the author have been repeated by us. The observations contained in the memoir appear to us to be well arranged and very correct, and if we have not submitted them all to a critical examination, it has been because we thought it desirable that attention should be concentrated upon those which bear more directly upon the theory.

In fact, in the memoir submitted to us, the author has not confined himself to the communication of the results of his experiments, he has endeavoured also to connect them in a general point of view, and to give them a theoretic bearing.

As this theory affects the opinions entertained on the nature of acids, bases, and salts, we will endeavour to indicate what are the disputed points. In tracing these opinions to their origin, we have to go back to a memoir by Lavoisier, entitled *General Considerations on the Solution of Metals in Acids*, contained in the publications of the Academy for 1782. This great Chemist, having observed that iron cannot dissolve in dilute sulphuric acid without disengaging hydrogen, or in dilute nitric acid without disengaging binoxide of nitrogen, while the iron, if previously oxidized, combines with these acids without any disengagement of gas, came to the conclusion, that in combining with acids, the iron must be in the state of oxide, and that in general salts are produced by the union of an acid and an oxide. Lavoisier, therefore, considered:

1. That every salt results from the combination of an acid and a base, which unite without losing their original molecular state.

2. That the acidifying force resides in oxygen.

Davy, who was the first to question the soundness of these principles, took an entirely different view.

Thus, while Lavoisier represented oxygen as the only acidifying principle, Davy absolutely denied that it possesses this property at all. Chloride of potassium, he states, is neutral; and, on the addition of six atoms of oxygen, converting it into chlorate of potash, it still is no less neutral. It is not therefore the nature of the elements, but their arrangement, which determines the formation of acids. If any element deserves to be called an acidifyer it is hydrogen.

If this principle be admitted it is easy to see the results of its application. According to Lavoisier all the acids are oxacids; according to Davy they are hydracids; and in sulphuric acid, for instance, there is a group, SO_4, which is united with an atom of hydrogen. This group plays the same part as chlorine does in hydrochloric acid. The anhydrous oxygen acids, therefore, are not acids according to Davy's view, and they only acquire that character when united with water. Moreover, the production of salts is a simple phenomenon of displacement, the metal of the salt taking the place of the hydrogen of the acid.

For some time past the labours of Chemists, including those of M. Gerhardt, have frequently contributed to strengthen the views of Davy, and to render more doubtful those of Lavoisier; and even those who have been most favourably inclined to the latter, are now obliged to admit that Davy's theory merits a very careful examination. The case may be stated thus:—

1. Davy ascribes to hydrogen the functions of a metal, and, in fact, its analogy with the metals is every day receiving fresh confirmation.

2. Davy contends that a salt is nothing else but a hydrated acid, in which, while the molecule remains in other respects unaltered, a metal takes the place of the hydrogen. Indeed, the formulæ, which, according to Lavoisier's theory, represent acids and bases as binary compounds of the first order, salts as binary compounds of the second order, double salts as binary compounds of the third order, &c., have become, it must be admitted, irreconcilable with the facts recently observed in the study of the molecular constitution of bodies.

3. The discovery of the polybasic acids presents no obstacle to the adoption of Davy's theory. Why may not an acid have either one or several atoms of hydrogen replaced by as many atoms of metal? The phenomena are not so naturally explained according to Lavoisier's views.

4. The old theory assumes the possibility of obtaining from any hydrated acid an anhydrous acid, without altering the molecular state which it possessed while in combination. Thus, for instance, according to Lavoisier's theory, hydrated acetic acid might be decomposed into anhydrous acetic acid and water, and each of these two products would be considered to have the same molecular constitution when separated that they had when combined.

According to Davy's theory, on the contrary, anhydrous acetic acid does not exist. In fact, acetic acid being $C_4 H_4 O_4$, if H be replaced by M, an acetate would be formed, $C_4 \left\{ \begin{matrix} H_3 \\ M \end{matrix} \right\} O_4$, in which the molecular type accords with that of the acid; but if $C_4 H_4 O_4$ loses H O and becomes $C_4 H_3 O_3$, this compound, which is called the anhydrous acid, is no longer acetic acid in a molecular point of view.

But the investigations of M. Gerhardt show that hydrated acetic acid gives four volumes of vapour, while the anhydrous acid gives only two volumes, from which it follows that the molecular constitution of these bodies is very different.

It appears further, that there exists a chloride of acetyle ($C_4 H_3 O_2$, Cl.). We may, therefore, admit the existence of a radical, acetyle (Ac) which acts as a simple body. This radical, furnished by an atom of acetic acid, may take the place of hydrogen in another molecule of acid. We may, therefore, ascribe to anhydrous acetic acid the formula of hydrated acetic acid, in which an atom of hydrogen has been replaced by a molecule of acetyle. We should thus have

Hydrated acetic acid .....$= C_4 \; H_4 \; O_4$

Acetates .....$= C_4 \left\{ \begin{matrix} H_3 \\ M \end{matrix} \right\} O_4$

Anhydrous acetic acid . .$= C_4 \left\{ \begin{matrix} H_3 \\ Ac \end{matrix} \right\} O_4$

This hypothesis is illustrated and almost justified by the example afforded in the case of benzoic acid, which admits of the replacement of its hydrogen not only by benzoyle (B_2) but also by acetyle (Ac). Thus—

Benzoic acid.....$= C_{14} \; H_6 \; O_4$

Benzoates .....$= C_{14} \left\{ \begin{matrix} H_5 \\ M \end{matrix} \right\} O_4$

Anhydrous benzoic acid $= C_{14} \left\{ \begin{matrix} H_5 \\ Bz \end{matrix} \right\} O_4$

Acetobenzoic acid .....$= C_{11} \left\{ \begin{matrix} H_5 \\ Ac \end{matrix} \right\} O_4$

5. The theory of Lavoisier explains without difficulty the great affinity of the acids for the bases, and the indifference of acids for acids, and of bases for bases; but the existence was not then foreseen of those strange compounds, discovered by Davy, which iodic acid forms with other acids, and which have been so little studied that it is not yet known to what class they belong. The theory of Davy explains them better, and derives real support from the discovery made by M. Gerhardt of a great number of analogous double acids.

6. When we compare ether to an oxide, alcohol to its hydrate, and the compound ethers to its salts, the doctrine of Lavoisier is an unerring guide; but it fails to assist us when required to explain why alcohol gives four volumes of vapour, while ether gives but two; and why, as has been so clearly proved by Dr. Williamson's experiments, two ethers when brought together in the nascent state, combine as do an acid and base, although these ethers scarcely differ the one from the other in their properties.

7. The following is the theory which is opposed to that of Lavoisier:

a. An element may replace another in a simple or compound molecular group, without the arrangement and constitution of the group being altered.

b. There are compound bodies which are capable of playing the part of simple bodies; they can take the place of simple bodies in a compound, without the molecular arrangement of the compound being destroyed.

Now, by means of these two propositions, all the phenomena which have been referred to as anomalous are explained without difficulty.

Thus, alcohol contains a radical, ethylium, and hydrogen, united with oxygen. If the hydrogen be replaced by ethylium, ether is formed; if it be replaced by methy-

lium, a double ether is formed; if by potassium, there is formed a compound corresponding to the preceding:

$$\left.\begin{matrix} C_4\ H_5 \\ H \end{matrix}\right\} O_2 \text{ Alcohol.}$$

$$\left.\begin{matrix} C_4\ H_5 \\ C_4\ H_5 \end{matrix}\right\} O_2 \text{ Ether.}$$

$$\left.\begin{matrix} C_4\ H_5 \\ C_4\ H_3 \end{matrix}\right\} O_2 \text{ Double Ether.}$$

$$\left.\begin{matrix} C_4\ H_5 \\ K \end{matrix}\right\} O_2 \text{ Potash Ether.}$$

Acetic acid contains a radical, acetyle, and hydrogen, united with oxygen. If the hydrogen be replaced by acetyle, anhydrous acetic acid is produced; if it be replaced by benzoile, acetobenzoic acid is formed; if by potassium, we get acetate of potash:

$$\left.\begin{matrix} C_4\ H_3\ O_2 \\ H \end{matrix}\right\} O_2 \text{ Acetic Acid.}$$

$$\left.\begin{matrix} C_4\ H_3\ O_2 \\ C_4\ H_3\ O_2 \end{matrix}\right\} O_2 \text{ Anhydrous Acetic Acid.}$$

$$\left.\begin{matrix} C_4\ H_3\ O_2 \\ K \end{matrix}\right\} O_2 \text{ Acetate of Potash.}$$

$$\left.\begin{matrix} C_4\ H_3\ O_2 \\ C_{14} H_5\ O_2 \end{matrix}\right\} O_2 \text{ Acetobenzoic Acid.}$$

For these very different compounds the new theory requires but one type, and, in general, it employs but a very small number to group together all the known bodies, while the theory of Lavoisier requires a great many.

Such are the advantages of the new opinions; as to their inconveniences, this is the principal, that they require a change in the nomenclature of salts.

Now, it is difficult, certainly, to abandon at present the nomenclature of Lavoisier; it has become not only the language of science, but that of the arts, and nothing short of undoubted evidence could justify us in making any radical changes in it in teaching. If the ideas which it expresses of the nature of acids and of salts leaves something to be desired, when it is required to arrange the facts which have been collected for years, or to draw conclusions from them,—if the molecular theory appears to be more perfectly applicable, let us give place to this theory in the memoirs intended for scientific Chemists and in discussions before learned societies, but it may be fearlessly asserted that, for elementary works, and for lectures addressed to students, the time has not yet arrived for discarding the hitherto received language.

If we relinquish this nomenclature in a hasty manner, we shall find every author and every professor adopting individual opinions, and impressing them on his readers or students. Every course of lectures would have its neologies, and every treatise its peculiar symbols and formulæ. The Chemistry studied in one school would be unintelligible to those having studied it in another school. We should have reproduced the confusion of languages which the old Academy of Sciences had the distinguished honour of putting an end to.

Furthermore, before proceeding to teach opinions which tend to establish that in carbonate of lime there is neither lime nor carbonic acid—that in sulphate of soda there is neither soda nor sulphuric acid—that iron is not in the same molecular state in the protoxide as in the peroxide of this metal, some little hesitation may be permitted, whatever may be the independence of thought and impartiality of judgment exercised in the examination of these questions.

Many Chemists will, no doubt, find it more simple to retain the theory of Lavoisier, and to add to it a remark, having for its object the grouping of the greater number of facts which have hitherto been proved. This remark is as follows:—*That the compounds of oxygen, when they are free, group themselves in the form of molecules composed of two equivalents.*

Carbonic acid, sulphurous acid, sulphuric acid, ethers, and organic acids, present this arrangement.

It must be understood that, at the moment of combination, these molecules separate or disconnect themselves, and that each equivalent, when liberated, enters as such into the compounds which it forms.

Thus, water being $\left.\begin{matrix}HO\\HO\end{matrix}\right\}$ = 4 volumes, and sulphuric acid $\left.\begin{matrix}SO_3\\SO_3\end{matrix}\right\}$ = 4 volumes, these two bodies, brought together, give by a true double decomposition,

$\left.\begin{matrix}HO\\SO_3\end{matrix}\right\}$ 4 volumes hydrated sulphuric acid

$\left.\begin{matrix}SO_3\\HO\end{matrix}\right\}$ 4 volumes ditto ditto

This principle will suffice for the present to connect the facts referred to with the theory of Lavoisier, and we shall then have in the fact itself of the discovery of the new anhydrous acids, the realization of one of the assumptions of that theory.

We will not carry this discussion further, but merely add that the author, in his memoir, adopts and develops the theory of molecular types, and by a series of very simple formulæ shows how his views with reference to the anhydrous acids are connected with a more general doctrine.

He requires, in fact, only the four following types for the classification of a great number of compounds:

Hydrogen ..... $\left.\begin{matrix}H\\H\end{matrix}\right\}$

Hydrochloric Acid.. $\left.\begin{matrix}H\\Cl\end{matrix}\right\}$

Water ..... $\left.\begin{matrix}H\\H\end{matrix}\right\}$ O_2

Ammonia..... ..... $\left.\begin{matrix}H\\H\\H\end{matrix}\right\}$ N

The bodies which are compared to hydrochloric acid and ammonia present nothing new. In fact, the experiments of Wurtz and Hofmann have left nothing to be added.

It is in reference to the groups of which hydrogen and water are the types that the author has given a new development.

It will be seen from the accompanying table, that by replacing by substitution, in either of the above types, one or more molecules of hydrogen by a new molecule of a simple body or a radical, a great number of compound bodies may be represented. The notation in the table, however, is not entirely conformable to that which the author has adopted.

Type.	Left or Positive Extremity.		Right or Negative Extremity.
Of water ..... $\left.\begin{matrix}H\\H\end{matrix}\right\}$ O_2	$\left.\begin{matrix}C_4H_5\\H\end{matrix}\right\}$ O_2 alcohol		$\left.\begin{matrix}C_4H_3O_2\\H\end{matrix}\right\}$ O_2 acetic acid
	$\left.\begin{matrix}C_4H_5\\C_4H_5\end{matrix}\right\}$ O_2 ether		$\left.\begin{matrix}C_4H_3O_2\\C_4H_3O_2\end{matrix}\right\}$ O_2 anhydrous acetic acid
	$\left.\begin{matrix}C_2H_3\\C_4H_5\end{matrix}\right\}$ O_2 ethylmethylic ether	$\left.\begin{matrix}C_4H_5\\C_4H_3O_2\end{matrix}\right\}$ O_2 acetic ether	$\left.\begin{matrix}C_4H_3O_2\\C_{14}H_5O_2\end{matrix}\right\}$ O_2 benzoic acetate
Of hydrogen . $\left.\begin{matrix}H\\H\end{matrix}\right\}$	$\left.\begin{matrix}C_4H_5\\H\end{matrix}\right\}$ hydride of ethyle		$\left.\begin{matrix}C_4H_3O_2\\H\end{matrix}\right\}$ aldehyde
	$\left.\begin{matrix}C_4H_5\\C_4H_5\end{matrix}\right\}$ ethyle	$\left.\begin{matrix}C\ H_3\\C_2H_3O_2\end{matrix}\right\}$ Acetone	$\left.\begin{matrix}C_4H_3O_2\\C_4H_3O_2\end{matrix}\right\}$ acetyle
Of hydrochloric acid..... $\left.\begin{matrix}H\\Cl\end{matrix}\right\}$	$\left.\begin{matrix}C_4H_5\\Cl\end{matrix}\right\}$ hydrochloric ether		$\left.\begin{matrix}C_4H_3O_2\\Cl\end{matrix}\right\}$ chloride of acetyle
Of ammonia ... $\left.\begin{matrix}H\\H\\H\end{matrix}\right\}$ N	$\left.\begin{matrix}C_4H_5\\H\\H\end{matrix}\right\}$ N ethylamine		$\left.\begin{matrix}C_4H_3O_2\\H\\H\end{matrix}\right\}$ N acetamide
	$\left.\begin{matrix}C_4H_5\\C_4H_5\\H\end{matrix}\right\}$ N diethylamine		
	$\left.\begin{matrix}C_4H_5\\C_4H_5\\C_4H_5\end{matrix}\right\}$ N triethylamine		

CHEMICAL AND PHARMACOLOGICAL EXAMINATION OF KINO.

BY C. HENNIG.

The author first satisfied himself, by a comparison of the most trustworthy statements, that the officinal kino known among druggists as the East Indian, should more correctly be called African, because it is for the most part the air-dried juice, which exudes from incisions made in the stems of several species of Pterocarpus, P. erinaceus, and P. senegalensis growing in the forests of Senegambia, and P. indicus and P. marsupium growing upon the coast of Malabar, and other parts of the East Indies.

These so-called oriental varieties of kino all present the following physical characters: colour garnet-red; fracture conchoidal. When chewed they colour the saliva red by transmitted, and violet by reflected light; the taste is purely astringent. The fragments of kino treated with distilled water dissolve partially, communicating a yellowish red colour to the water, which, when allowed to stand and even when excluded from the air, deposits a fine orange coloured powder, forming a deposit of sometimes as many as three layers. This is again almost entirely dissolved by hot water or alcohol. But neither boiling water or alcohol dissolve kino completely, a more or less swollen skeleton of each individual fragment always remaining. The addition of distilled water to the tincture causes a faint cloudiness, which disappears again spontaneously. Ether produces a precipitate in both aqueous and alcoholic extracts, but both become clear on standing. When the tincture, containing ether, is evaporated, it becomes turbid at the boiling point, from the separation of cinnamon-coloured flocks, which subsequently redissolve with violent agitation of the liquid. Ether does not take up anything even from finely-powdered kino.

Tincture of kino reddens litmus somewhat more distinctly than the aqueous infusion. The former is precipitated by alkalies; the latter only by carbonate of ammonia; neither give any precipitate with lime water or tartrate of potash and antimony. Protochloride of iron gives with the aqueous infusion a deep green colour, and green flocks separate after some time. Perchloride of iron gives a greyish or yellowish-green bulky precipitate; lead salts give various precipitates according as the infusion is prepared with hot water or cold, when air has access or the contrary.

African kino burnt in a porcelain crucible leaves about two per cent. of ash, consisting of phosphate of soda, carbonate of lime, phosphate of magnesia, traces of sulphate of lime, and silicate of iron. When submitted to dry distillation it gives, off an odour resembling vanilla, acid water then passes over (perhaps formic acid) and some empyreumatic substances not examined; pyrogallic acid could not be detected. Heated upon platinum foil it swells up, evolving first agreeable and then acid vapours.

As the author could not succeed in effecting a simple separation of the astringent principle of kino, the behaviour of various reagents with aqueous and alcoholic infusions was more carefully examined. The separation of the tannic acid by means of a solution of gelatine, recommended by Gerding, is imperfect; but if, on the other hand, a prepared animal skin is employed, only a little gallic acid is left in the liquid, inasmuch as the red colouring matter enters into combination together with the tannic acid, forming a red leather. The contact of oxygen with Gerding's coccotannic acid, gave a different result; a stream of oxygen passed through the aqueous infusion of kino does not cause any perceptible alteration of the tannin even after long warming, the colouring matter alone appearing to be oxidized. The opinion that the red colouring matter is a product of the alteration of the tannic acid, is rendered improbable by the action of sulphurous acid, which gives to the aqueous infusion a yellow colour, although the red substance is not converted into anything resembling tannic acid, but is partially precipitated in the form of orange-coloured flocks, which redissolve in alkalies with a red colour; the tannic acid gave the same reactions as before, and in the evaporated liquid crystals of the sulphate of the alkali used were formed. Moist chlorine behaved in a similar manner, with the exception that the yellow precipitate floated in a colourless liquid, and the tannic acid itself appeared to be altered.

The products obtained by the action of caustic potash upon raw kino, and those obtained by treating the powdered gum with hydrochloric acid for the purpose of

separating the earthy bases, were submitted to analyses and found to correspond closely with the substance called kino red by Gerding.

Strong nitric acid decomposes all the constituents of kino, especially when heat is applied; nitric oxide and hydrocyanic acid are evolved, and the liquid contains nitropikric acid and oxalic acid.

Hennig attempted to separate the tannic acid of kino by taking advantage of the fact that ordinary tannic acid is dissolved by acetic acid, and remains in solution even on the addition of water, while the red substance of kino is at first completely precipitated on diluting the solution in acetic acid with water. Raw kino in fine powder was digested for some days with concentrated acetic acid, the liquid evaporated, and the residue digested with very cold water until it began to acquire colour. The product obtained in this way was, however, too small.

The fractional precipitation of the solution of kino by means of metallic salts, especially acetate of lead, yielded larger quantities of tolerably pure tannic acid. This salt first combines, apparently in substance, with the "kino red;" subsequent precipitates always contain larger percentages of oxide of lead and larger quantities of tannic acid, but the acetic acid set free somewhat disturbs the result. For this reason the aqueous infusion of kino was treated with successive portions of hydrated oxide of lead, but still the tannic acid obtained, though large in quantity, was impure. Finally, Hennig found that the most advantageous process was to precipitate the concentrated alcoholic decoction of kino with subacetate of lead, added drop by drop until only a few drops of pure water filtered out of the brownish-red jelly which was formed; the mass was then digested in very cold distilled water, until it began to communicate a colour to it, when it was poured off and filtered rapidly. This liquid contained the greater part of the tannic acid. This process may be supposed to consist either in a combination of the acetate of lead with the red colouring matter of the kino only, and that the tannic acid is mechanically retained until the alcoholic jelly is saturated with water, or that both substances form lead salts, and that the contact with water causes a decomposition, in consequence of which tannic acid is set free. It is advisable to use a slight excess of subacetate of lead rather than not, for the quantity of tannate of lead dissolved in that case is insignificant compared with the freedom of the tannic acid from colouring matter.

After the addition of a sufficient quantity of moist hydrated oxide of lead, the slightly reddish coloured tannate of lead was separated and introduced into a retort, when it was dried in a stream of hydrogen gas. Hennig obtained from two analyses the following results, corresponding with Berzelius's formula for tannic acid of oak:

C	14	53.16	52.7
H	10	3.71	3.9
O	8	43.13	43.5

The analysis of the lead salt gave:

C	18	34.02	33.00	34.55
H	18	5.67	5.93	5.92
O	10	25.19	26.67	25.23
PbO	1	35.12	34.40	34.30

The elements are here nearly in the same proportions as in Rochleder's, catechuic acid and the difference may be owing to an admixture of acetic acid.

Hennig is of opinion that the red colouring matter so intimately combined with the tannic acid, may be obtained best by treating the aqueous infusion from which the above-mentioned yellow deposit has separated, with finely powdered hydrated oxide of lead, until the liquid is nearly decolourized. The substance obtained from the lead compound in the ordinary manner, gave on analysis

C	11	43.65	43.71
H	5	3.31	3.31
O	10	53.04	52.98

Basic acetate of lead is better suited to the separation of this red colouring matter than neutral acetate; however, the lead compound prepared with the former, is not one with an excess of base, but shows that the above empirical formula must be multiplied by 5:

C	55	38.08
H	25	2.88
O	50	46.16
PbO	1	12.88

Hennig calls this substance kinoic acid.

The third substance contained in African kino is very difficult to obtain colourless and free from the above acid. Hennig endeavoured to prepare it by digesting the already mentioned spontaneous deposit from the aqueous infusion with successive quantities of water until it was no longer coloured upon standing, and gave no reaction with perchloride of iron, then extracting it with strong alcohol, saturating the tincture with neutral acetate of lead and drying the precipitate, collected on a filter, under the air-pump. Analysis gave 25.29 per cent. oxide of lead and

C	29	41.74	41.74
H	22	4.99	4.73
O	25	53.27	53.53

corresponding closely with the formula of Jahn's pectic acid. This substance appears to be more prone to alteration by external influences than the former, and passes finally into ulmic acid, which partly constitutes the residue left on the extraction of kino by water or alcohol.

The quantitative relations of the several constituents of kino may be represented in the following order:

Kinoic acid
Tannic acid and a trace of gallic acid
Pectin
Ulmic acid
Inorganic salts with an excess of earthy bases.

Bischoff and Mohr have already put forward the opinion that the astringent substance in kino is identical with ordinary tannic acid, at least in reference to the characteristic precipitation with persalts of iron, and the possibility of obtaining this reaction with various kinds of kino, tormentilla, and other plants, induced Hennig not only to give up the opinion that coccotannic acid is a definite substance, but likewise to regard the different kinds of tannic acid, which precipitate persalts of iron green or grey, and are admitted by Chemists to be in almost every case distinct substances, as intimate mixtures of tannic acid, which gives a blue precipitate with persalts of iron, and some modifying substance, such as a yellow or red colouring matter. He found, however, that the tannic acid from kino differed from that of the oak in two particulars, viz., the solubility in ether and the reaction with potassio-tartrate of antimony; but he considers that the minute and probably inappreciable quantity of kinoic acid mixed with the tannic acid might be sufficient to account for these discrepancies.

The red substance which Hennig calls kinoic acid corresponds with the colouring matters associated with tannic acid in elm bark, catechu, cinchona bark, coffee, &c., and cannot, in kino at least, be regarded as a product of the oxidation of tannic acid, but is probably the derivative of a colourless substance, for, according to Pereira, the fresh juice of the kino-tree has but a faint reddish tint.

This red substance is more readily soluble in alcohol than in cold water, and to it the alcoholic solution owes not only its intense red colour but likewise its acid reaction. It gives a yellowish brown precipitate with perchloride of iron, and a brownish red one with acetate of lead. It partly separates from the hot aqueous solution on cooling. From these characters many who have previously examined this substance inferred that it was a resin, an opinion which Mohr opposes. A. W. Buchner states that he has detected catechine in kino, and ascribes to it the production of a green precipitate with persalts of iron. Hennig, however, expresses his conviction that catechin is not present in true kino, and is only a constituent of those drugs which are varieties of catechu, although frequently confounded with kino, viz., Uncaria or Nauclea Gambir, the product of Erythina monosperma.

The behaviour of this red colouring matter towards the tannic acid is remarkable, for it not only adheres to it with obstinacy, perhaps holding it, together with the pectin, for some time in solution, but likewise gives reactions with acids, bases, and salts, in a manner resembling the conjugate acids. Hennig considers that the red colouring matter of kino originally existed in a colourless state, combined with the tannic acid, and that during its subsequent alteration by the air, in consequence of the absorption of oxygen, the state of combination is not destroyed, but continues, perhaps, even until the formation of ulmin has taken place.

The presence of pectin in kino has been already conjectured by Pereira. He considers "that kino consists principally of a peculiar substance (eucalyptin)

analogous somewhat to pectin and tannic acid," and he infers this especially from its behaviour with alkalies and the precipitate formed with lime water. Still this precipitate could not be obtained with African kino, which is not the produce of Eucalyptus resinifera. The vegetable gelatine is the cause of the kino swelling in water and alcohol, and gives rise to the formation of the substance deposited from solutions of kino, even when air is excluded, and gradually becoming more insoluble on further treatment with indifferent menstrua. It is this circumstance which has led to the opinion that kino is a gum, although no one has ever obtained from it a substance soluble in water and precipitible by alcohol. But the pectin, in its combinations with earthy bases, or with tannic acid, must behave in a very variable manner with reagents, unless indeed we must ascribe to the difficultly removable kinoic acid (Vauquelin obtained only a *red* gum) at least such an influence upon the pectin that it separates so quickly from cold water, but is then dissolved by alcohol as well as by hot water.—*Archiv. der Pharmacie*, February, 1853.

ON THE ESTIMATION OF PHOSPHORIC ACID AND THE PHOSPHATES BY MEANS OF NITRATE OF URANIUM.

BY M. CH. LECONTE.

Having ascertained the great insolubility of phosphate of uranium, it occurred to me that it might be employed for estimating phosphoric acid in all bodies containing it, and thus serve to simplify the processes which have been proposed for this purpose.

In order to give to my proposed process the required precision, it was necessary to start with well-known chemical compounds, and phosphate of soda presented, in this respect, the required condition. The phosphate of soda used was purified and perfectly good.

The almost absolute insolubility of phosphate of uranium, and the rapidity with which it is deposited in the liquors in which it has been formed, render it applicable for the estimation of phosphoric acid either by precipitation or by the use of a graduated test-liquor.

In operating by precipitation I have found the following method to afford accurate results:—

The liquor containing a phosphate, as nearly neutral as possible, is to be strongly acidulated with acetic acid; excess of nitrate of uranium is then to be added, and the mixture boiled for some minutes.

As soon as the solution is removed from the fire the precipitation of the phosphate commences, and in less than five minutes it is complete, a perfectly limpid liquor floating over a dense precipitate which is easily washed by decantation.

The precipitate is to be washed with hot distilled water when the phosphoric acid has been precipitated from an alkaline phosphate; but if it has been precipitated directly from combination with lime, it is necessary to wash the precipitate with water acidulated with acetic acid, to remove the small quantity of lime which the phosphate of uranium retains. By this means the precipitated phosphate is obtained quite free from lime.

Yellow prussiate of potash is, next to the phosphates, the most delicate reagent for the salts of uranium. It forms with them a reddish brown precipitate, similar to that formed with the salts of copper, and if the liquor contains but a trace of oxide of uranium, a very distinct rose colour may be observed when the liquor is contained in a tube, the end of which is placed over a piece of white paper or a porcelain plate.

It is thus easy to determine when the phosphate of uranium has been completely washed. When this has been effected the precipitate is put on to a filter and allowed to drain.

If the filter be now placed on a piece of bibulous paper the phosphate will acquire sufficient consistence to admit of its being collected and almost wholly removed from the filter into a platinum crucible, a mere trace of it only being left on the paper. This latter is to be dried in a stove, and incinerated on the cover of the crucible. If care be taken to burn it in small portions at a time, one portion being completely consumed before the next is added, the resulting ash will be of a bright yellow colour. If, on the contrary, this precaution be not adopted the ash will be more or less of a greyish colour, or perhaps completely brown, in consequence of the formation of a phosphuret. In this case the capsule should be allowed to cool and a few

drops of nitric acid added to the ash. On heating it again a bright yellow product is almost always obtained, but should this not be the case the nitric acid must be again used.

The employment of the nitric acid has the disadvantage of causing the ash to adhere to the platinum, and thus preventing it from being easily collected with the rest of the phosphate. This difficulty, however, may be removed by having a crucible the cover of which fits to it with its concave or convex face.

It is always better to prevent the formation of the phosphuret, for the addition of the ash of the filter to the rest of the precipitate is then easy, and nothing more is required than to heat the crucible with the phosphate to redness in the flame of a spirit lamp.

If, instead of operating as above, the liquor with the precipitate be thrown at once on to a filter, the process of washing the precipitate is greatly prolonged.

One of the many advantages presented by the use of oxide of uranium for estimating phosphoric acid arises from the high equivalent number of the resulting phosphate. The equivalent of uranium being 750 (as compared to oxygen = 100), that of its sesquioxide is 1800. Moreover, as this sesquioxide, in combining with acids, plays the part of a protoxide, the tribasic phosphate of oxide of uranium is represented by the formula ($3U_2O_3$, PO_5), the equivalent of which is 6.3000. Of this the phosphoric acid constitutes but one seventh.

Admitting then that in conducting such an analysis, an error be committed to the extent of a centigramme, which would be unlikely to occur, this error would only affect the quantity of phosphoric acid to the extent of 0.00143 of a gramme, which would be unimportant.

If instead of operating by precipitation, which always occupies some time, it be desired to effect the estimation by the use of a graduated test liquor, by which the determination may be more quickly made, I recommend the following method, which has been adopted after numerous trials.

If the phosphate to be estimated be soluble in water, it is only necessary to take a gramme of it, and to dissolve it in a litre of distilled water. If, on the other hand, the substance to be operated upon is insoluble, a gramme or two of it, according to its presumed richness in phosphoric acid, is to be calcined with five or six times its weight of pure fused carbonate of soda. The mass is then to be treated with distilled water, to separate the insoluble base and dissolve the alkaline phosphate, the former being well washed, and the alkaline liquors neutralized with nitric acid, and made up to the volume of a litre.

Although I have succeeded in my experiments in separating the phosphoric acid from almost all the insoluble phosphates, without resorting to calcination with carbonate of soda, yet, as my experiments in this direction are not completed, I thought it better to indicate the above method, which is frequently adopted, and affords satisfactory results.

The liquors being thus prepared, the analysis is effected as follows :—

Into a small flask or bottle of the capacity of 200 cubic centimetres, is introduced fifty centimetres of a solution of nitrate of uranium which has been purified with the greatest care, and containing 4.416 grammes of nitrate of uranium to the litre. Every cubic centimetre of this solution will represent 0.0005 gramme of anhydrous phosphoric acid, and even this minute quantity may be estimated with great accuracy.

Into the fifty cubic centimetres of solution of nitrate of uranium, a few drops of solution of caustic potash are to be added, so as to precipitate the oxide of uranium, and then dilute acetic acid is to be added drop by drop to redissolve the oxide and render the solution neutral.

It is important to observe these precautions in order to avoid the errors which might result from the presence of one or two equivalents of water in the constitution of the phosphate. In that case a portion of the nitric acid of the nitrate of uranium, when set free, would hold a small quantity of the phosphate of uranium in solution; but acetic acid being almost wholly without action on the salt, does not interfere with the accuracy of the results.

The solution of the phosphate is now to be gradually added from a burette to the uranium solution. The first drop will produce a precipitate which will increase with further additions, and this precipitate will quickly subside, leaving the liquor perfectly limpid. As the process proceeds, a small drop of the liquid is to be taken

on a glass rod and applied to a white porcelain plate previously moistened with a solution of yellow prussiate of potash (one part of the salt to twenty-five parts of water). The depth of colour developed will indicate the quantity of oxide of uranium contained in the solution. The liquid is to be thus examined after each addition of the phosphate. When a deep red colour is produced by the prussiate of potash, the further addition of the phosphate may be made boldly, but when only a slight colour is produced, the further additions of phosphate must be made drop by drop until the colour is no longer developed. The process it now complete.

It is important in this process to operate on colourless liquids, for any colour in the liquid itself would render it difficult to determine when the oxide of uranium has been completely precipitated.

It is also important that the liquid to which the phosphate is added should not be too acid, for a minute quantity of phosphate of uranium would, in such case, be held in solution; and as the prussiate of potash is at least as delicate a test of the salts of uranium as the phosphates, it results that a slight rose colour is produced under such circumstances after the oxide of uranium has been wholly converted into phosphate. In operating on phosphate, having the constitution (2 MO, HO, PO_5), an atom of nitric acid of the nitrate of uranium is always set free; it is well, therefore, from time to time to add a little weak solution of potash to the uranium solution so as to keep it but slightly acid. If too much potash should be accidentally added, which is known by the formation of a bright yellow precipitate, a drop or two of dilute nitric acid will restore the liquor to its proper state.—*Repertoire de Pharmacie.*

ON THE USE OF MOLYBDATE OF AMMONIA AS A REAGENT FOR ARSENIC IN CASES OF CHEMICAL JURISPRUDENCE.

BY H. STRUVE.

Since the year 1848, when Svanberg and myself proposed the molybdate of ammonia as a reagent for phosphoric acid, its use has become general. Soon after that time H. Rose showed that arsenic acid resembled phosphoric acid in its behaviour with molybdate of ammonia, but did not give any account of the mode in which it should be applied. This circumstance induced me in the early part of last year to make some experiments on the subject. The result of these experiments showed that molybdate of ammonia indicates the presence of arsenic acid only when nitric acid is used, and not hydrochloric; but I did not at the time follow up the practical application of the reagent. Subsequently on undertaking the management of the chemical investigations for the medical department, during the absence of M. Fritsche, I again took up this subject. The duties of this office gave me frequent opportunity of examining precipitates which had been sent for the purpose of ascertaining the presence of arsenic; and in these operations I found the molybdate of ammonia an extremely delicate means of detecting arsenic in any state of combination.

I would consequently propose the use of this substance in chemico-legal investigations, as presenting two advantages; first, in determining whether stains obtained with Marsh's apparatus are referable to arsenic; and, secondly, in furnishing a means, when the presence of arsenic has been proved in any substance, of separating it easily in such a form that it can afterwards be tested in Marsh's apparatus.

The reaction upon which this test depends consists in the peculiar behaviour of a solution of arsenic acid towards a large excess of a solution of molybdate of ammonia in nitric acid, at a moderately elevated temperature. Here, as in the case of phosphoric acid, a yellow precipitate is separated, consisting of well developed dodecahedrons, recognizable by the microscope and insoluble in acids, and various saline solutions. The only difference is, that for the formation of the phosphoric acid precipitate, it is not necessary to heat the solution. At the ordinary temperature the arsenic acid precipitate is not acted upon by concentrated sulphuric acid; but on the application of heat it is dissolved to a colourless liquid, from which nothing is precipitated on dilution with water.

This precipitate consists of a compound of arsenio-molybdate of ammonia, containing nearly seven per cent. of arsenic acid.

When this salt, in a dry state, is heated in a test tube, it is decomposed, water and

ammonia are disengaged, while arsenious acid sublimes and oxide of molybdemum remains behind. When heated with a small quantity of carbon, metallic arsenic sublimes, and the presence of this metal in the compound may thus be recognized with ease.

When the yellow salt is brought into contact with zinc sulphuric acid and water, in a gas generator, the disengagement of arseniuretted hydrogen does not commence until after some considerable time, in consequence partly of the salt, by virtue of its insolubility, escaping decomposition by the dilute acid, and partly because the first stage of decomposition consists in the reduction of the molybdic acid to oxide of molybdenum.

In a direct experiment made with regard to this point, traces only of arseniuretted hydrogen were evolved, a quarter of an hour after adding the yellow compound; before that time only pure hydrogen.

In order to effect the immediate disengagement of arseniuretted hydrogen, it is only requisite by some means to decompose the arsenio-molybdate of ammonia. This may be done by any alkali; best by ammonia, or by boiling with concentrated sulphuric acid.

The following is the mode of applying this reagent for the detection of arsenic:—

We will suppose, that by means of Marsh's apparatus, the well-known spots have been produced upon a glass tube or a porcelain dish, and it is required to ascertain whether they are referable to arsenic or not.

For this purpose the incrustation must be dissolved by the aid of heat in a minute quantity of nitric acid, and the solution introduced with a few drops of water into a test tube. A large excess of a solution of molybdate of ammonia in nitric acid is then to be added, and the whole heated to ebullition. If the spot has been produced by arsenic, a yellow precipitate is then formed, either immediately, or when the incrustation is very minute after standing for some time. This reaction is the most unquestionable indication of arsenic. The appearance of the reaction is considerably accelerated by placing the test tube with its contents for some time upon the sand-bath, for in this case the continued action of heat effects what is otherwise the result of time. This method of detecting the presence of arsenic after its oxidation to arsenic acid, is so delicate, that a very distinct precipitate is obtained, after some time of rest, in solutions containing only $\frac{1}{300000}$ arsenic acid. In solutions containing $\frac{1}{600000}$ the reaction is no longer perceptible.

When it is required to test metals for arsenic and the blowpipe reaction cannot be employed, molybdate of ammonia may be used with advantage, especially, for instance, when zinc or antimony are to be examined for this metal. For this purpose it is only requisite to oxidize with nitric acid a small quantity of the metal to be examined, to collect the oxide on a filter, and test the filtrate.

In order to test the delicacy of this method I mixed pure tin with $\frac{1}{10}$ of a per cent. of arsenic. I then treated two grammes of this alloy with concentrated nitric acid in a porcelain dish until all the tin was converted into oxide and then filtered. I added a part of this clear filtrate to a solution of molybdate of ammonia in nitric acid, and after heating the reaction took place.

This reaction is not interfered with by the presence of other metals, because they all form soluble compounds with nitric acid.

The method which I propose for adoption in chemico-legal inquiries is based upon the above described behaviour of arsenic acid to molybdate of ammonia. It is applicable in all cases in which it is requisite to separate, from any solution or substance, arsenic in such a form that it can be tested in Marsh's apparatus, and it obviates the necessity for any further examination of the metallic mirror obtained.

In seeking for arsenic the ordinary course is to decompose the organic substance by boiling with chlorate of potash and hydrochloric acid, evaporating the liquid to remove the large excess of acid; to filter, and treat the solution with sulphurous acid so as to reduce the arsenic acid, formed by the oxidation, to arsenious acid; to treat with sulphuretted hydrogen, collect the precipitate, oxidize it, test its solution in Marsh's apparatus, and finally to examine the metallic mirror.

By employing molybdate of ammonia this mode of proceeding is thus altered:

The substance to be examined for arsenic is heated in a flask with chlorate of potash and hydrochloric acid until the greater part of the organic matter is decomposed and the solution has assumed a clear brown colour. The whole is then evaporated in a porcelain dish to drive off the excess of acid, treated with water

and filtered. The clear solution is evaporated with the wash water to a small bulk, and after it has cooled an excess of a solution of molybdate of ammonia in nitric acid is added. A yellow precipitate is immediately formed, and if the precipitation is complete, collected upon a filter, washed with water, containing nitric acid, and marked with the letter A. The filtrate, together with the wash water, is placed on the sand-bath heated to the boiling point and allowed to rest for some time. Under the influence of heat another yellow precipitate is soon formed, which, when it no longer appears to increase, is collected upon a filter and marked B.

The precipitate A, which separates at the ordinary temperature, consists of phospho-molybdate of ammonia, and when the precipitant has been added without any application of heat, does not contain a trace of arsenio-molybdate of ammonia. The phosphoric acid of this precipitate originates from the organic substances in which the phosphorus exists, partly as phosphoric acid and partly in the phosphuretted protein compounds.

When there is any doubt that in adding the precipitant, elevation of temperature has been avoided, it is possible that the precipitate A may contain a small quantity of arsenic acid, and then it is necessary to test this salt in Marsh's apparatus.

The precipitate B, produced on heating the liquid, contains small quantities of phospho-molybdate of ammonia, as this compound is not completely separated until the liquid is slightly warmed; but consists, when arsenic is present in the substance examined, for the most part of arsenio-molybdate of ammonia. For this reason a portion of this precipitate, after being dissolved in ammonia, is to be tested in Marsh's apparatus. When the substance contains arsenic, it is certainly present in the precipitate B, and is indicated by the usual stains, which in this case cannot arise from anything but arsenic.

As a proof of the applicability of the method, I will give the following experiment:—A hen's egg, weighing 45 grammes, was broken in pieces and impregnated with 0.01 grm. of arsenious acid, in a flask, and treated in the manner above described. In the precipitate, A, I was unable to recognize a trace of arsenic, although this could easily be done in the precipitate B. The entire operation from beginning to end did not occupy more than twenty hours.—*Bullet. de St. Petersbourg*, and *Journal für praktische Chemie*, May, 1853.

ON THE MANUFACTURE OF GLYCERIN.

BY CAMPBELL MORFIT, M.D.

Glycerin is generally made, on the large scale, either by directly saponifying oil with oxide of lead; or from "the waste," or spent leys of the soap-makers. The first mode of obtaining it is complex and expensive, while in the latter, the difficulty of wholly separating the saline matters of the "waste" renders it impossible to obtain a perfectly pure product. In view of these obstacles, and the increasing demand for the article, both in medicine and perfumery, I submit a new process, which has been found, by actual practice, to combine the great and desirable advantages of economy of time, labour, and money.

Take 100 pounds of oil; tallow, lard, or "stearin" (pressed lard), place it in a clean iron-bound barrel, and melt it by the direct application of a current of steam.

While still fluid and hot, add fifteen pounds of lime, previously slaked and made into a milk with two and a-half gallons of water, then cover the vessel and continue the steaming for several hours, or until the completion of the saponification. This is known when a sample of the resulting and cooled soap gives a smooth and lustrous surface on being scraped with the finger nail, and breaks with a cracking noise. By this treatment the fat is decomposed, its acids unite with the lime to form insoluble lime soap, while the eliminated glycerin remains in solution in the water along with the excess of lime. After it has been sufficiently boiled, it is allowed to cool and settle, and is then to be strained through a crash cloth.

The soap is reserved for sale to stearic candle-makers, or else may be reconverted into saleable fat by the process given at pp. 432—445 of Morfit's *Applied Chemistry*.

The strained liquid contains only the glycerin and excess of lime. It must be carefully concentrated by steam heat. During evaporation, a portion of the lime is deposited on account of its lesser solubility in hot than in cold water. The remainder is removed by treating the evaporated liquid with a current of carbonic

acid gas, boiling by steam heat, to convert any soluble bicarbonate of lime that may have been formed, into insoluble neutral carbonate, allowing repose, decanting or straining off the clear supernatant liquid from the precipitated carbonate of lime, and further evaporating, as before, if necessary, to drive off any excess of water.

As nothing fixed or injurious is employed in the process, the glycerin thus prepared will be absolutely pure.—*Silliman's Journal.—From American Journal of Pharmacy.*

Baltimore, Md., March, 1853.

ON THE PREPARATION OF LACTATE OF PROTOXIDE OF IRON.

BY M. C. J. THIRAULT.

In the preparation of lactate of iron by the processes described in chemical works, difficulties are frequently encountered, especially in the concentration of the liquor for the purpose of obtaining the salt in crystals. Even should a first crystallization be obtained without difficulty, on concentrating the mother-liquors in order to obtain a second crystallization, the liquid acquires a reddish tint owing to the peroxidation of the salt, which now refuses to crystallize. Another difficulty presents itself in drying the lactate of iron when obtained. If certain precautions be not taken the salt, instead of being of a yellowish-white with a tinge of green, acquires a reddish-yellow colour, in which case it is in great measure peroxidized.

All these difficulties, which I have experienced in making the salt for the first time, in addition to the facility with which lactic acid combined with lime may be artificially prepared, induce me to publish the processes which I have always found successful.

There are two processes for obtaining solution of lactate of protoxide of iron, either of which may be employed with equal success. The one consists in the direct action of lactic acid on iron filings, and the other in the double decomposition of protosulphate of iron and lactate of lime. But to whichever of these the preference is given, it is essential in carrying out the process according to my mode of operating, to have a small quantity of lactic acid in reserve.

The following is the mode of operating if the former of the two processes indicated above be adopted:—

After having prepared lactate of lime in the usual way, by artificial means, it is necessary to test the degree of purity of the salt, as it is difficult to get it always in the same state, for not only does it frequently contain carbonate of lime, but the amount of water present is always variable. It should be ascertained, therefore, what quantity of sulphuric acid of a definite strength is required for the complete decomposition of a given quantity of the lactate.

For the preparation of lactate of iron a certain quantity of the lactate of lime is mixed with the required quantity of sulphuric acid for its decomposition, the latter being mixed with ten or twelve times its weight of water, and allowed to stand in contact with it, without heat, for forty-eight hours, the mixture being stirred from time to time. It may then be filtered through a cloth to separate the sulphate of lime, when a solution of lactic acid, sufficiently pure for the purpose intended, will be obtained.

If it be desired to get the lactic acid in a greater state of purity, the decomposition of the lactate of lime may be effected with oxalic acid instead of sulphuric acid, but for the purpose referred to this is unnecessary, as the small quantity of sulphate of lime which it would retain when sulphuric acid is used would be deposited during the concentration of the solution.

Two-thirds of the lactic acid, obtained in the manner indicated, is to be added to iron filings in an iron vessel, and the action promoted by the application of heat. When the iron ceases to be acted upon the liquor is to be filtered, and if the directions above given have been followed it will be in a condition favourable to crystallization. The solution, as it filters, should be received in a vessel immersed in warm water, and this should be subsequently covered. After five or six days the sides of the vessel will be found to be covered with a crystalline coat of lactate of iron. It only remains to dry the salt, which is very easily effected by first washing it with a mixture of one part of lactic acid and eight parts of spirit, and afterwards exposing it to a temperature of from 60° to 70° Fahr., on filtering paper or on a chalk-stone.

In order to effect the crystallization of the mother-liquor some of the free lactic acid, which was kept in reserve, is to be added to it, together with some iron filings, and the mixture rapidly evaporated, while the hydrogen gas, resulting from the action of the acid on the iron, is being evolved. The lactate is thus preserved from undergoing peroxidation, and the whole of the liquor may be exhausted of its salt.

An equally satisfactory result with that above described may be obtained by double decomposition, but as it is necessary in this case to use very weak solutions of sulphate of iron and lactate of lime, and subsequently to concentrate the liquor in order to effect crystallization, the peroxidation of the salt must be prevented by keeping up the disengagement of hydrogen in the manner already described.—*Journal de Pharmacie.*

PREPARATION OF MODELLING CLAY WHICH REMAINS PERMANENTLY SOFT.

Barreswil* recommends for this purpose the use of glycerin. He states that figures of clay, kneeded up with this substance, may be left for a considerable time without being injured or requiring to be wetted.

ON ERGOT OF RYE.

BY F. L. WINCKLER.

The introduction into medical use, under the name of Ergotin, of a preparation of this singular production, has led to a renewed examination of it by the author. Although on account both of its peculiar origin and of its remarkable specific action as a medicine, it has for a long series of years been the subject of botanical, chemical, and medical research, the results which have been obtained are far from being complete or conclusive.

The ergot used in this investigation was collected at the commencement of harvest of last year, without any regard to its stage of development, dried at 132.8° F., powdered and treated first with ether until every trace of oil was separated, and then with water.

The oil left after the evaporation of the ether amounted to 34.4 per cent. of the ergot; it had a yellowish-green colour, was turbid, after some time a brownish-green sediment was deposited, the oil was then clear, thick, of a deep yellow colour, and had a very unpleasant rancid odour.

According to all previous experience the specific medicinal action of ergot is not attributable to this oil, consequently it was not further examined.

The liquid obtained by perfect extraction with water was tolerably concentrated, clear, of a pale violet colour, frothed when shaken, and gave with bichloride of mercury, alum, and nitric acid indications of a not inconsiderable quantity of albumen. A portion of it was treated with strong alcohol until there was no longer any turbidity produced, and the albuminous matter separated by filtration. The alcoholic filtrate was then evaporated in a water-bath to the consistence of an extract. During this operation a brown powder separated in not inconsiderable quantity, redissolving as the liquid became more concentrated, and presenting all the characters of the substance called *ergotine* by Wiggers.

The residue thus obtained dissolved readily in alcohol and water, a brown powder being separated at the same time. The aqueous solution had a bitterish, and not as Wiggers states, sharp taste, leaving a sensation of cold like peppermint. When distilled with caustic lime it yielded a distillate of an extremely disagreeable odour, which, when neutralized with hydrochloric acid and evaporated in a water-bath, left a considerable quantity of the chlorine compound of a volatile substance analogous to propylamin (secalin).

This distillate contained no ammonia, and its essential constituent is considered by the author to be a compound of secalin with ergotin (Wiggers), which he regards as an acid.

Besides the above compound the ergotin extract contained both organic and inorganic salts, among the former formic acid, among the latter phosphoric acid, found also by Wiggers. The author was likewise able to recognize the presence of sugar.

* Journal de Pharmacie. December, 1852.

The ergot which had been treated as above with ether and water was pressed, and then digested with four times the quantity of alcohol, eighty per cent. The liquid had a bright reddish-brown colour, filtered perfectly clear, and left on evaporation only a small quantity of a smeary residue, which dissolved partly in water, while a minute quantity of a dark-coloured fat separated. When distilled with caustic lime it yielded only a trace of secalin with ammonia. By this treatment very little colouring matter was separated from the ergot; and as the author's previous experiments had led him to infer that this colouring matter was very analogous to the hœmatin of blood, he treated the ergot with a mixture of alcohol and dilute sulphuric acid. The result was that he obtained a red, ferruginous substance, which in every respect presented the greatest resemblance to hœmatin of blood.

The author is of opinion that these results put it beyond doubt that ergot contains several nitrogenous substances which have a close chemical relation to each other. As the most important, he regards the secalin—analogous in all its characters to the volatile alkaloids—and ergotin—a nitrogenous acid. Besides these there are the red colouring matter, resembling, if not identical, with hœmatin, a basic substance, which requires examination, and albumen; a large quantity of fat oil, which appears to replace the starch in the normal grain; sugar, which determines the tendency of the aqueous infusion to ferment, formates and phosphates.

According to the author, the ergot powder for medicinal use should be perfectly dried at a temperature not exceeding 132.8° Fah., and kept in well-stoppered glass vessels. The aqueous extract he considers to be the most active preparation, but it cannot be kept. The alcoholic tincture made with alcohol of forty per cent., contains all the active constituents and but little of the oil.

The alcoholic extract, ergotin extract, prepared in the following manner, has been found very active, and keeps well. The finely powdered ergot is treated twice with an equal quantity of cold distilled water, the liquid strained, and perfectly precipitated with alcohol of eighty per cent. The alcoholic liquid, after standing twenty-four hours, is filtered, and the filtrate evaporated. The extract thus prepared is but slightly hygroscopic.

Winckler proposes that experiments should be made with the hydrochlorate of secalin, the compound of secalin and ergotin, which he calls ergotate of secalin, with the red colouring matter and the neutral compound of ergotin with ammonia, for the purpose of determining wherein consists the medicinal virtue of ergot.—*Jahrbuch für praktische Pharmacie.* March, 1853.

ON THE FORMATION OF SALICYLIC ACID IN THE BLOSSOMS OF SPIRÆA ULMARIA.

BY L. A. BUCHNER.

Although Piria has long since shown that salicin, under the influence of oxidizing agents, gives rise to salicylic acid, it was not certain that this substance originated in the same manner in the blossoms of the *spiræa*. Recent experiments of the author have rendered it probable that these blossoms when young contain salicin.

The flower buds of this plant have scarcely any smell, and consequently cannot contain more than mere traces of salicylic acid. Their taste is balsamic, astringent, bitter, resembling willow bark. When the flowers are distilled a small quantity of salicylic acid passes over, but the residue yields a fresh quantity of the acid when treated with bichromate of potash and sulphuric acid as would be the case if they contain salicin.

The author then extracted the flower buds with boiling water, treated the liquid with neutral and afterwards with basic acetate of lead. Both salts produced bright yellow precipitates, the quantity of that produced by the former salt being much the largest.

The colourless liquid left after perfect precipitation and filtering was freed from lead by sulphuretted hydrogen and evaporated. A brownish very sweet and bitter syrupy residue remained which dissolved partially in alcohol. This alcoholic solution left on evaporation an amorphous viscous mass with a persistent bitter taste; with concentrated sulphuric acid it gave a red colour; by distillation with bichromate of potash and dilute sulphuric acid it yielded besides formic acid oily drops of salicylic acid. Even after standing for a year the syrupy liquid furnished no

crystals of salicine, doubtless on account of the preponderating quantity of amorphous sugar present.

It follows, therefore, from these reactions and others which were tried that the salicylic acid generated in the development of the bud to the flower originates from salicine.

The two lead precipitates above mentioned appear to contain the same organic substances, probably citric acid and a variety of tannin.—*Neues Repertorium für Pharmacie*, 1853.

CONTRIBUTIONS TO THE PHYSIOLOGY OF THE SPIRACEÆ.

BY W. WICKE.

The above experiments of Buchner acquire an especial interest from the following observations of Wicke. He finds that salicylic acid, or at least the substance from which it is produced, is very generally present in the members of the family spiracæ and in the various organs; and, secondly, that the shrubby spiraceæ, which are evidently more closely allied to the pomaceæ than the herbaceous members of the former family, contain amygdalin.

Thus the distillate obtained from the herbaceous spiraceæ, gathered in June, contains salicylic acid and no hydrocyanic acid, while that of the shrubby plants contains hydrocyanic and no salicylic acid. The distillates from the leaves and roots of sp. ulmaria from the entire plant of sp. digitata, sp. lobata, sp. filipendula, contain salicylic acid. The distillates from sp. aruncus, sp. sorbifolia, sp. japonica, contain hydrocyanic acid. Neither of these acids are found in the distillates from sp. levigata, sp. acutifolia, sp. ulmifolia, or sp. spulifolia.

The author directs attention to the fact that the leaves of sp. sorbifolia and those of sp. aucuparia are remarkably similar, and that the leaves of sp. aruncus, which are of a very complex kind, have the same typical character of form. On comparing the leaves of sp. filipendula and of sp. ulmaria with those of the above-named members of this family the analogy in form is obvious.

The other two herbaceous spiraceæ, sp. lobata and sp. digitata, are characterized by a more simple form of leaf; but this may be assumed to be the fundamental form of the more complex leaves. These herbaceous spiraceæ are further chemically characterized by the fact that on distillation with water they yield salicylic acid.

If, then, the assumption is correct that the salicylic acid found originates from salicin and the hydrocyanic acid from amygdalin, the occurrence of these two substances in this family is a fact worthy of attention, for both of them are conjugate compounds containing sugar. Both suffer this remarkable change in contact with emulsion. Salicin splits up into saligenin and sugar; amygdalin into hydrocyanic acid, hydruret of benzoyle, and sugar. Saligenin, by assimilating two equiv. of oxygen and separation of two equiv. of hydrogen, passes into salicylic acid, which may be thus directly formed from salicin. But further, salicylic acid is isomeric with benzoic acid, which is formed from hydruret of benzoyle by the assimilation of two equiv. of oxygen. Again, saliretin is isomeric with hydruret of benzoyle, which is formed from saligenin by the separation of two equiv. of water.

This relation which appears to exist between the structure of the plants and the chemical substances which occur in them, the author proposes to express by the term "isomophism of organic nature," regarding here instead of the actual replacement of one atom by another the similarity of physiological agency, and instead of similar crystal-form analogous structure of the plants.—*Annalen der Chemie und Pharmacie.*

ON SYRUP OF IODIDE OF IRON AND MANGANESE.

BY WILLIAM PROCTER, JUN.

The attention of the medical profession has recently been awakened to the advantages to be derived from the use of the salts of iron and manganese in combination, when preparations of iron alone have heretofore been indicated. Among the compounds used by M. Petrequin, is a syrup of iodide of iron and manganese; but the method suggested for its preparation from the solid iodides by M. Burin-Dubuisson, is too indefinite to be generally adopted, besides involving the necessity of previously preparing and keeping the solid iodides. The following formula yields a preparation of the strength of the officinal syrupy solution of iodide of iron, and the manner of using it, and the doses are the same.

Take of Iodide of potassium .....1000 grains
Proto-sulphate of iron (in crystals) ..... 630 "
Proto-sulphate of manganese, " ..... 210 "
Iron filings (free from rust)..... 100 "
White sugar (in coarse powder).....4800 "
Distilled or boiled water, a sufficient quantity.

Triturate the sulphates and the iodide separately to powder, mix them with the iron filings, add half a fluid ounce of distilled water, and triturate to a uniform paste. After standing a few minutes, again add half a fluid ounce of distilled water, triturate and allow it to rest fifteen minutes. A third addition of water should now be made and mixed. The sugar should then be introduced into a bottle capable of holding a little more than twelve fluid ounces, and a small funnel, prepared with a moistened filter, inserted into its mouth. The magma of salts should then be carefully removed from the mortar to the filter, and when the dense solution has drained through, distilled or boiled water should be carefully poured on in small portions, until the solution of the iodides is displaced and washed from the magma of crystals of sulphate of potash. Finally, finish the measure of twelve ounces, by adding boiled water, and agitate the bottle until the sugar is dissolved. The solution of the sugar may be facilitated, when desirable, by standing the bottle in warm water for a time, and then agitating.

Each fluid ounce of this syrup contains fifty grains of the mixed anhydrous iodides in the proportion of three parts of iodide of iron to one part of iodide of manganese, and the dose is from ten drops to half a fluid drachm.

Remarks.—Owing to the slight solubility of the resulting sulphate of potash, and the small quantity of water employed to effect the interchange of elements, but little of that salt is contained in the syrup. The object of the iron filings is to saturate any free iodine that may be eliminated during the exposure consequent on the gradual reaction of the salts. The use of either distilled, or cold recently boiled, water, is necessary to obviate the effect of air on the iodides. It is necessary to allow sufficient time for the complete decomposition of the sulphate of iron, else the syrup will be contaminated with it. The proper moment to lixiviate the sulphate is known by the cessation of the crystallization of the sulphate of potash. The bottle should be shaken from time to time during the filtration to protect the filtered solution, and the washing process should be stopped as soon as the sulphate ceases to have a well-marked taste of the iodides. Practically in this, as in all cases where syrups are made by agitation, and are not to be filtered, it is best to use pure lump sugar, and coarsely powder it for the occasion, as the commercial powdered sugar frequently contains dusty impurities. The preparation when finished has a very pale straw colour; if the salts have not been all decomposed before the washing, the syrup will have a greenish colour, and subsequently deposit crystals of sulphate of potash by standing.—*American Journal of Pharmacy.*

ON THE ACTION OF HYDRATED PEROXIDE OF IRON.

BY FEHLING.

At the suggestion of the Medical College in Stuttgart, Fehling has made some experiments upon the action of hydrated peroxide of iron which has been kept for a longer or shorter time. He found that,

1. 100 grm. of the pasty fresh precipitated hydrate, prepared according to the directions of the Pharmacopœia, and containing five per cent. of dry hydrate, precipitates 0.350 grm., and almost 0.400 grm. of arsenious acid, while that which had been kept a year precipitated only 0.200, even after digestion for two hours.

2. The hydrated oxide of iron precipitates arsenious acid in the same quantity when combined with potash, soda, or ammonia, as when in a free state. The presence of sulphate of ammonia, of chloride of ammonium, of free ammonia, of carbonate of potash or soda, is not prejudicial to the precipitation.

3. The liquid obtained by precipitating sulphate of iron by an excess of magnesia, and containing besides hydrated oxide of iron, free magnesia and sulphate of magnesia, precipitates arsenious acid in larger quantity than the hydrated peroxide present in it does alone; it precipitates the arsenious acid of Fowler's solution; from solutions of Schweinfurter green in vinegar both arsenious acid and oxide of copper, while the pure hydrated peroxide does not precipitate oxide of copper.

4. According to these results, it cannot be doubted, that it is better to prepare the hydrated oxide as occasion may require, fresh from a solution of a persalt kept for the purpose. Fehling recommends the use of persulphate of iron and carbonate of soda.—*Archiv. der Pharmacie.*

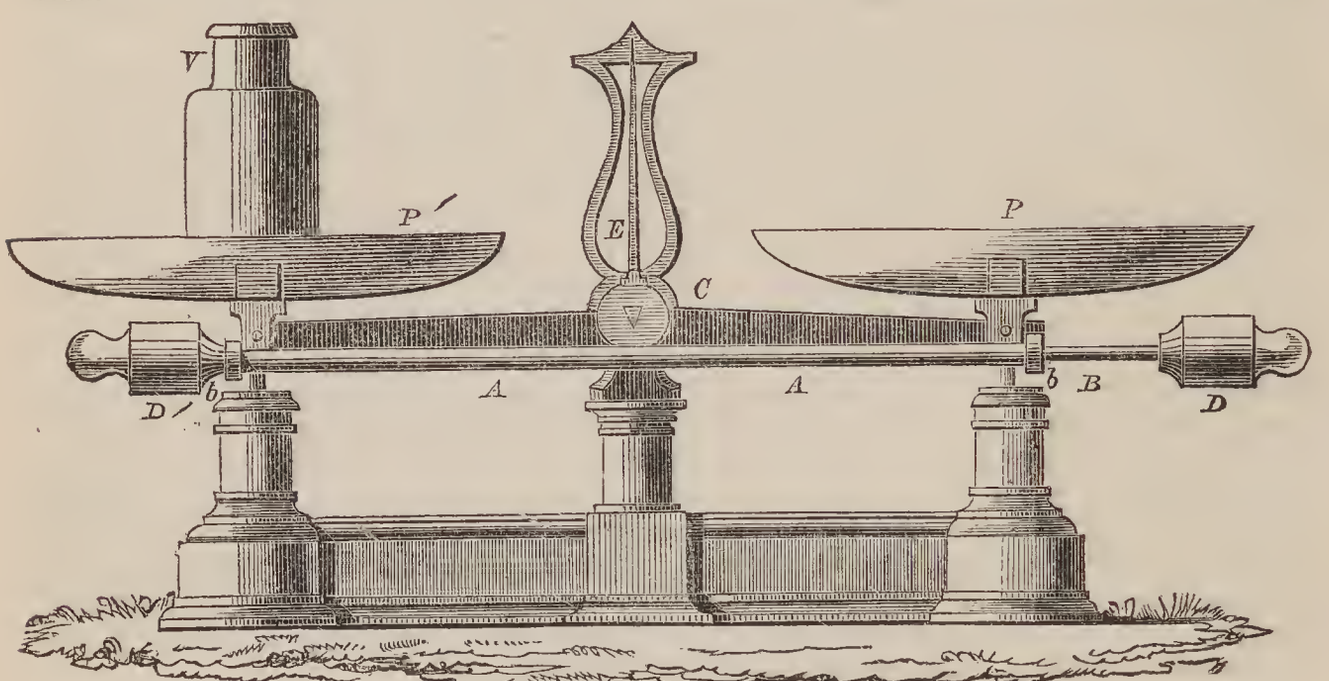
WEIGHING MACHINE FOR TAKING THE TARE OF VESSELS.

The accompanying plate represents a contrivance for this purpose which has been made by MM. Renou and Guérin.* It is very simple, easily managed, and has the greater advantage of being applicable to any kind of balance, as well as admitting of the true weight of the substance weighed being placed alone on the balance, thus obviating any chance of error from calculation.

It will be evident from the drawing that the arrangement consists simply of a brass tube, A A, into which slides an iron or steel rod, B, which is retained in any desired position by a small lateral spring fastened to the interior of the tube A. The tube A is connected with the balance at both ends by *b b*, and at one end is a knob D′, which serves as a counterpoise to the knob D on the sliding rod.

When the rod B is pushed into the tube the balance is like any other in equilibrium. If now a liquid or any other substance is to be weighed in a vessel V, this is placed upon the scale-pan P′, and the rod B drawn out until it is counterpoised.

Instead of the smooth rod B, a screw with a more or less inclined thread may be used.



CHEAP METHOD OF PREPARING CHROME RED.

BY PROFESSOR RUNGE.

This process consists in the decomposition of chloride of lead by bichromate of potash: 448lbs. of litharge, 60lbs. of chloride of sodium, and 500lbs. of water are intimately mixed. As soon as the mass becomes white and swells up considerably, more water is added to prevent its becoming too hard. After about four days the mass consists of a compound of chloride and hydrated oxide of lead. Without separating the mother-liquor which contains undecomposed chloride of sodium and soda, 150lbs. of powdered bichromate of potash is added, the whole well stirred together and finally washed.—*Polytechn. Notizblatt.* No. 1.

PROCEEDINGS OF THE PHILADELPHIA COLLEGE OF PHARMACY IN RELATION TO THE INSPECTION OF DRUGS.

A Special Meeting of the Philadelphia College of Pharmacy was held at their Hall, 3d mo., 30, 1853.

Charles Ellis, Vice President, in the chair.

In the absence of the Secretary, Edward Parrish was appointed Secretary *pro tem.*

* Armengaud's Génie Industriel, November, 1852, p. 233.

The call of the meeting being read, the object was stated to be to consider the subject of the Inspection of Drugs.

The subject was then more fully introduced by several of the members, who urged, that in view of the probable change in the office of Special Examiner at this port, it was due to the position of this College, and to the important interests involved, that we should be heard in our corporate capacity in regard to the qualifications of persons who should be appointed to fill such offices.

The difference in the practice of Examiners at the various ports of entry was adverted to as a cause of annoyance The opinion was advanced that, unless in the hands of competent and disinterested officers, the law was productive of more evil than good results. It cannot be disguised, that, as at present administered at this port, it has given great dissatisfaction, occasioning useless delays and unnecessary loss to importers ; and, in many instances, embarrassing the operations of trade without any corresponding advantage to the public.

The construction given to that passage of the law referring to the Pharmacopœias and Dispensatories as standards, was a subject of discussion, and it was believed advantage would result from a fuller explanation of its meaning and intent, as originally designed by its framers.

A draft of a Memorial to the Secretary of the Treasury, in relation to the proper qualifications for the office of Special Examiner, was submitted by Professor Procter; and, on motion, it, together with the whole subject of the meaning and intent of the law, as brought under discussion at this meeting, was referred to a committee of five, which was appointed by the chair, as follows:—Wm. Procter, Jun., Dr. John Harris, Thos. H. Powers, H. C. Blair, and E. Parrish.

On motion, It was further resolved, that this Committee be authorized to send two delegates, taken from the College at large, to deliver the Memorial, as finally perfected by them, to the Honourable Secretary of the Treasury, and to represent to that officer the views of this College in regard to the intention of the law and its proper construction, and that the said Memorial and the credentials of the said delegates be stamped with the seal of the College and signed by its proper officers.

On motion, It was also resolved, that said delegation to Washington be authorized to draw on the Treasurer of the College for the amount of their expenses in carrying out this direction.

Then adjourned.

EDWARD PARRISH, *Secretary pro tem.*

The committee to whom the Memorial, &c., was referred, met at the College Hall on Tuesday, the 31st of May, at four o'clock, P. M., and having carefully revised the Memorial referred to them, and considered the sense of the Special Meeting as related to instructing the deputation to be sent to Washington, concluded their labours by the appointment of Daniel B. Smith, President of the College, and William Procter, Jun., Chairman of the Committee, to that service.

MEMORIAL.

To the Hon. James Guthrie, Secretary of the Treasury of the United States, the Philadelphia College of Pharmacy respectfully represent:

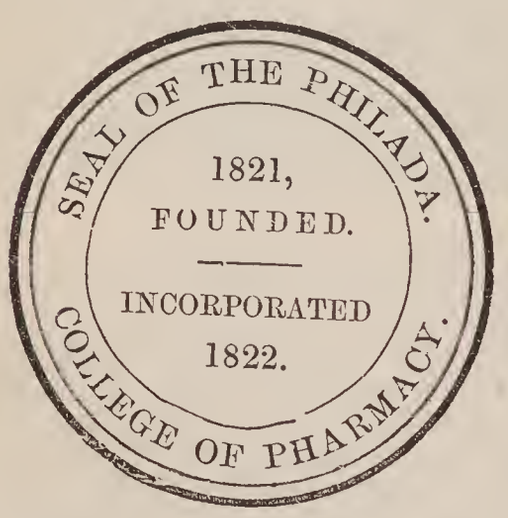
That their Institution was established more than thirty years ago, through the public spirit of a number of the Apothecaries and Druggists of Philadelphia, and incorporated by the Legislature of Pennsylvania, with the design of improving the character of the drug and apothecary business, and for affording a better and more scientific education to the younger members of their profession; and now includes a large number of the best educated pharmaceutists of that city. This College, feeling themselves intrusted with a care for that part of the public weal involved in the preparation and dispensing of medicines, and consequently with the condition of the drug market (upon the soundness of which the healthy condition of Pharmacy much depends) did, for many years previous to the enactment of the Drug Law, appoint annually a "Committee of Inspection," whose duty it was to keep a watch over the character of the drug market, and warn its members, through their published Journal, of the existence therein of spurious or deteriorated drugs. They have also interested themselves, from time to time, in special measures having the same object, and more especially, in connexion with the other Colleges of Pharmacy, in regard to the *Act of Congress* requiring the inspection of imported drugs. Since the passage of that law, they have watched its influence on the quality of drug

importations, and have been gratified with the improvement that has occurred in many particulars; yet they are forced to admit that inferior qualities of drugs do gain admittance into the country, and that serious and perplexing difficulties have occurred at several of the ports, owing to the variable construction of the law by the Examiners, by which honestly-disposed importers have been inconvenienced and annoyed, and have suffered considerable losses from delay and the expenses incident to a reconsideration of the Examiner's decision.

Believing that the practical value of the law to the well-disposed Druggist and Apothecary, and to the Physician, and its usefulness through these to the community, depends in a great degree on the knowledge and faithfulness of the Examiners, we feel called upon respectfully, yet earnestly, to urge on your attention, in the exercise of the appointing power, the importance of a close scrutiny into the qualifications of these officers for the highly responsible duties assigned to them; and we feel assured that in pointing out some of the requisites of a good officer, you will give us credit for an honest desire to aid in the successful execution of the *Enactment.*

As a large proportion of the drugs imported into the United States are of a description requiring an intimate acquaintance with their physical and sensible properties, rather than their chemical constitution, in properly subjecting them to inspection, it is indispensable that the Examiner should have had a *practical pharmaceutical education,* especially as many mixed medical compounds are in the list of imported articles, the merits of which cannot be judged by the abstract Chemist. He should also be a practical Chemist, so as to perform the chemical analyses and testing required in the execution of his duties himself, and not be necessarily dependent on others for knowledge and skill which he is employed to exercise, and which should be exercised in view of all the circumstances pertaining to the drugs examined. These, with the business-habits requisite to insure the Government from imposition in regard to the value and construction of invoices, and the integrity without which all other qualifications are ineffectual, should be found in the Special Examiner of Drugs.

In view of these circumstances, we would earnestly recommend, other requisites being equal, that well educated Pharmaceutists, or, at least, individuals who have had a practical Pharmaceutical education, should claim the preference among the candidates for the Examinership; trusting that your sense of the truth of the positions we have taken will induce you to act in accordance with them.



Signed,

W. B. Smith, *President.*

Charles Ellis, } *Vice-Presidents.*
Samuel F. Troth, }

Dillwyn Parrish, *Secretary.*

At a Special Meeting of the Philadelphia College of Pharmacy, held May 30th, 1853, with Charles Ellis, first Vice-President, in the chair, it was directed that the above Memorial to the Secretary of the Treasury of the United States be engrossed, duly signed by the officers, and the seal of the College affixed, and that two members of the College be deputed to present it to the Hon. Secretary at Washington, with such verbal explanations as may be necessary to convey to that officer a proper understanding of the document. (Signed)

Edward Parrish, *Secretary pro tem.*

In accordance with their instructions, the deputation proceeded immediately to

Washington, and obtained an interview with the Secretary of the Treasury. After stating the object of their visit, and presenting the Memorial of the College, they explained more fully the views entertained by that body in reference to the necessity of issuing new and more definite instructions to the Special Examiners, so as to avoid the irregularities that were liable to occur as at present; and also the importance of appointing men to the office of Examiners who are practically qualified by having had a pharmaceutical education. Mr. Guthrie replied, that he had become aware, since being in office, of the need of a revision of the instructions previously issued by the Department, and that Dr. Bailey (the Examiner at New York), at his request, was engaged in preparing a paper for his consideration, which he believed would meet the views of the College, and which would be published in a few days. He further stated that, should the new instructions be inadequate to meet the just requirements of the law, they could be modified.

CIRCULAR OF INSTRUCTIONS TO THE SPECIAL EXAMINERS OF DRUGS.

[The following copy of the Treasury Circular, is from the *North American*, of June 14th.]

TO PREVENT THE IMPORTATION OF ADULTERATED DRUGS AND MEDICINES.

To Collectors and other Officers of the Customs, under the Act of 26th June, 1848.

TREASURY DEPARTMENT, *June* 4, 1853.

It being represented to this Department, that much embarrassment has been experienced by officers of the customs, at some of the ports of the United States, in reference to the provisions of the Act of 26th June, 1848, "to prevent the importation of adulterated and spurious drugs and medicines," it is deemed expedient, with a view to avoid future difficulties arising from misconstructions of the law, and to secure uniformity of practice at the several ports in carrying out its provisions with precision and efficiency, to furnish you with the additional instructions which follow, explanatory and in modification of the circular instructions addressed to you by the Department on the 8th July, 1848.

To avoid the recurrence of a difference of opinion between the officers of the customs as to what particular articles of commerce should be considered drugs and medicines, and as such subject to special examination by the special examiner of drugs and medicines, it is thought proper to state that, in conformity with the evident spirit and intent of the law, it is required that all articles of merchandize used wholly or in part as medicine, and found described as such in the standard works specially referred to in the act, must be considered drugs and medicines, and that all invoices, therefore, of such articles, in whole or in part, must be submitted to the examination of the special examiner of drugs and medicines, before they can be permitted to pass the custom-house.

In the examination on entry of any medicinal preparation, the said special examiner is to unite with the appraiser.

With a view to afford a reliable guide to the examiner of drugs and medicines, as well as to the analytical chemist, on appeal, in ascertaining the admissibility of such articles under the provisions of the law founded on their purity and strength, the following list is given of some of the principal articles, with the result of special tests agreeing with the standard authorities referred to in the law, all of which articles are to be entitled to entry when ascertained by analysis to be composed as noted, viz.:—

Aloes, when affording eighty per cent. of pure aloetic extractive.

Assafœtida, when affording fifty per cent. of its peculiar bitter resin, and three per cent. of volatile oil.

Cinchona bark, when affording one per cent. of pure quinine, whether called Peruvian, Calisaya, Arica, Carthagena, Maracaibo, Santa Martha, Bogota, or under whatever name, or from whatever place; or

Cinchona bark, when affording two per cent. of the several alkaloids combined, as quinine, cinchonine, quinidine, aricine, &c., the barks of such strength being admissable as safe and proper for medicine and useful for chemical manufacturing purposes.

Benzoin,	when affording	80	per cent.	of resin, or
"	"	12	"	of benzoic acid.
Colocynth,	"	12	"	of colocynthin.
Elaterium,	"	30	"	of elaterin.
Galbanum,	"	60	"	of resin :
"	"	10	"	of gum and
"	"	6	"	of volatile oil.
Gamboge,	"	70	"	of pure gamboge resin, and
"	"	20	"	of gum.
Guaiacum,	"	80	"	of pure guaiac resin.
Gum ammoniac,	"	70	"	of resin, and
"	"	18	"	of gum.
Jalap,	"	11	"	of pure jalap resin, whether in root or powder.
Manna,	"	37	"	of pure mannite.
Myrrh,	"	30	"	of pure myrrh resin, and
"	"	50	"	gum.
Opium,	"	9	"	of pure morphine.
Rhubarb,	"	40	"	of soluble matter, whether in root or powder ; none admissible but the articles known as East India and Turkey, or Russian rhubarb.
Sagapenum,	50	per cent.		of resin.
"	30	"		of gum, and
"	3	"		of volatile oil.
Scammony,	70	"		of pure scammony resin.
Senna,	28	"		of soluble matter.

All medicinal leaves, flowers, barks, roots, extracts, &c., not herein specified, must be, when imported, in perfect condition, and of as recent collection and preparation as practicable.

All pharmaceutical and chemical preparations, whether crystallized or otherwise, used in medicine, must be found on examination to be pure and of proper consistence and strength, as well as of perfect manufacture, conformably with the formulas contained in the standard authorities named in the act ; and must in no instance contain over three per cent. of excess of moisture or water of crystallization.

Essential or volatile oils, as well as expressed oils used in medicine, must be pure, and conform to the standards of specific gravity noted and declared in the dispensatories mentioned in the act.

" Patent or secret medicines" are by law subject to the same examination, and disposition after examination, as other medical preparations, and cannot be permitted to pass the custom-house for consumption, but must be rejected and condemned, unless the special examiner be satisfied, after due investigation, that they are fit and safe to be used for medicinal purposes.

The appeal from the report of the special examiner of drugs and medicines, provided for in the act, must be made by the owner or consignee within ten days after the said report ; and in case of such appeal, the analysis made by the analytical chemist is expected to be full and in detail, setting forth clearly and accurately the name, quantity, and quality of the several component parts of the article in question ; to be reported to the collector under oath or affirmation.

On such report being made a copy of the same will be immediately furnished by the collector to the special examiner of drugs and medicines, who, if the report be in conflict with his return made to the collector, and he have cause to believe that the appeal and analytical examination have not been conducted in strict conformity with the law, may enter his protest in writing against the reception and adoption by the collector of such report and analysis, until a reasonable time be allowed him for the preparation of his views in the case, and their submission to this department for its consideration.

American Journal of Pharmacy. JAMES GUTHRIE, Secretary of the Treasury.

PROFESSIONAL QUACKERY.

THE stand which medical associations have taken in regard to quackery has been clear and decided—no quarter is given—no compromise permitted; yet quackery in a modified form is acknowledged and encouraged by many of the very men who are most decided in their condemnation of the more glaring species. An apothecary invents a compound of some well-known drug or drugs, sends specimens of it to

certain prominent physicians, accompanied by a statement of its superior qualities, and invites them to prescribe it. So far all is well; every apothecary has a perfect right to manifest his enterprise, by anticipating the wants of his medical patrons. But when the physician has tried it and is pleased with its effects, and prescribes it in other neighbourhoods, his patients are compelled to go to the original apothecary, who refuses to divulge the secret of its composition and mode of preparation. If the physician asks for it, he is told in such general terms, that he is unable to give the recipe. Now, if physicians are true to their principles, they should refuse to prescribe a preparation the recipe of which is withheld from them, for there is really little difference between prescribing such preparations and regular quackeries.—*American Journal of Pharmacy.*

BOOKS RECEIVED.

On the Anæsthetic Properties of the *Lycoperdon Proteus*, or common Puff-Ball. By Benjamin W. Richardson. Reprinted from the "Association Medical Journal." London: Printed by T. Richards, 37, Great Queen Street. 1853.

Explosions in Coal Mines: *their Causes, and the Means available for their Prevention or Control; containing a Review of the Report of the Committee of* 1852 *on the subject. A Letter addressed to Lord Palmerston on the late Explosions, and on Mining Inspection; and Notes on various forms of the Davy Lamp, and their relative value.* By J. Kenyon Blackwell, F.G.S., &c. &c. London: Taylor and Francis, Red Lion Court, Fleet Street. 1853.

Crétins and Idiots: *A Short Account of the Progress of the Institutions for their Relief and Cure.* London: W. A. Wighton, 17, Lower Eaton Street, Grosvenor Place; and Davidson, 18, Old Boswell Court, Carey Street. 1853.

A Dictionary of Arts, Manufactures, and Mines; *containing a clear Exposition of their Principles and Practice.* By Andrew Ure, M.D., F.R.S., &c. &c. Illustrated with nearly 1600 engravings on wood. Fourth edition, corrected and greatly enlarged. In two volumes, pp. 1118 and 998. London: Longman, Brown, Green, and Longmans. To be reviewed next month.

TO CORRESPONDENTS.

A Voice from the Laboratory.—We have received a communication, purporting to emanate from the Laboratory at Bloomsbury Square, but, being anonymous, and containing as it does personal remarks, by no means courteous or becoming, we decline to publish it. We may, however, notice one portion of the letter in reference to a circumstance on which some explanation may be desirable, for the information of students generally. The author complains of the limitation of the course of instruction at the School of Pharmacy since the year 1845, when four courses of lectures were delivered, namely, by Mr. Fownes on Chemistry, Dr. A. T. Thomson on Botany, Dr. Pereira on Materia Medica, and Mr. Redwood on Pharmacy; which courses are now reduced to two, namely, one on Chemistry and Pharmacy, by Mr. Redwood; and one on Botany and Materia Medica, by Mr. Bentley. The following passage is quoted from the Annual Report of the year 1845:—

"It should be our ambition to insure the most complete and effectual education, and to yield to no institution in the quality of the lectures and the eminence of the professors we engage."

The curtailment of the instruction and the diminution of the staff of professors is represented as a departure from this pledge of the Council; but the author of the remarks forgets that the parties responsible for the change are the young men for whom the lectures were provided, but who failed to attend in sufficient numbers to justify the Council in continuing the courses on the scale adopted at the time referred to. It was on this account that it was found necessary to retrench an expenditure which had been thrown away upon persons incapable of appreciating the advantages offered.

The late Case of Poisoning by Strychnia.—The author of the prescription writes to say that the copy of it in our last number, page 40, should have been as follows:—

℞ Pulv. Strychnos
Nucis Vomicæ ℈ij.
Bismuth. Nit., ʒiss.
Pulv. Rhei, g. viij.

M. et divide in chart xxiv. quarum, cap. 1 ter die ante mensâ.

The copy published last month was furnished to us by a Chemist who had been in communication with the parties concerned.

J. W. S. will be informed by the Secretary when he may attend the Board of Examiners.

A. R. A. inquires what precautions he should take to secure admission in the Laboratory at Bloomsbury Square? He should forward his name to Mr. Redwood, from whom he would receive all the information he requires.

Several other Correspondents have made similar inquiries, but give us no opportunity of answering them, as we cannot occupy our space with answers to anonymous Correspondents on subjects of a private nature.

M. P. S. (City).—The term spiritus etheris chlorici is applied to a preparation called chloric ether, which is a mixture of chloroform and spirit of wine, the proportions of which are arbitrary—usually, we believe, one part in five or six.

A Member (Spilsby).—For chloric ether, see above.

M. P. S.—The separation of the metal from hyd. c. cretâ frequently occurs when mixed with a tenacious extract or pill mass. (See vol. i., page 194.)

Adjutor (Sheffield).—Candidates may pass the major and minor examinations without becoming Members. They are, however, eligible for admission as Members on production of certificates, satisfactory to the Council, forms of which may be obtained from the Secretary.

An Inquirer (Bewdley) will find formula and instructions respecting the preparation of Collodion, vol. viii., pages 169, 251, 435, 524; vol. xii., page 303. Collodium cantharidale, vol. ix., page 141. See also page 68 of this number.

Ignoramus (Stroud).—(1.) See the advice to Students in our number for January, 1853.—(2.) See vol. vii., No. 7.—(3.) Vaccination is better than camphor as an antidote to small-pox.

A Young Chemist suggests the admixture of a vegetable oil with the lard in making unguentum hydrargyri, which facilitates the division of the mercury. This plan is referred to, vol. xii., page 498. The term sweet oil, in the article referred to, is used to denote rape oil. See also vol. i., page 194.

Juvenis (Cambridge).—(1.) "Hospital Sulphate of Quinine" is said by the proprietors to be identical with the sulphate of quinine of commerce; but it is not purified, and contains colouring matter.—(2.) The substitution would not be justifiable.—(3.) Syrup. quina et ferri iodidi. (See vol. xi., page 431.)

W. E. (Slough).—Mentha viridis is intended.

J. B. (Lynn).—Chromic acid is sometimes used for decolourising oils.

Studenda.—(1.) The concluding part of Pereira's *Materia Medica* is not yet published.—(2.) *Essentia Secalis Cornuti.* Bruised ergot, ℥j.—Boiling water, f. ℥ij.—Infuse 24 hours, and add rectified spirit, f. ℥iss, Digest ten days and filter (*Lancet*, 1827-8, page 435). f. ℥iss. is equivalent to ℈ss of the powder.

A. L. D. (Haythorpe)—Phillips's *Translation of the London Pharmacopœia*, published by Highley, Fleet Street. 10*s.* 6*d.*

Justicia.—An inquest was held, but we do not see any advantage in publishing further particulars.

H. J. (Bognor).—The suggestion is worthy of consideration, but we think it would be premature to adopt it at present. It is probable that a list of the registered Pharmaceutical Chemists and Members of the Society will be published periodically. This subject will require further consideration.

P. J. (Stamford).—Chloride of potassium is a compound of potassium and chlorine. Potassæ chloras, or chlorate of potash, is a compound of potassium, chlorine, and oxygen.

M. A. P. (Sittingborne).—In liquor potassæ arsenitis, the arsenious acid is not combined with the potash, but merely dissolves in solution of carbonate of potash. On the addition of an acid the latter would be decomposed.

An Associate (Exeter).—The tests for iodide of potassium are given in the Pharmacopœia. There is no such compound as nitrate of bromine.

Erratum.—Last No. p. 11, 12th line from the bottom, *for* Sunderland, *read* Thirsk.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. III.—SEPTEMBER 1st, 1853.

THE OBJECT OF THE SPECIAL GENERAL MEETING.

The purpose for which the Council have called a Special General Meeting of the Members, is briefly stated in the notice which has been circulated, and of which a copy will be found in the Transactions of the Society for the present month (page 102). In the absence of some explanation, the matter to be considered by the meeting might appear to be of too trivial a nature for the occasion, and the policy of appealing to the Members on the subject of a few random charges against the Council might be called in question. The proceedings of all public bodies are open to criticism, and even if the language employed in such criticism be somewhat intemperate, and not free from personalities, this is what persons who hold any public office must be prepared to meet, and ought to be able to bear without flinching. Opinions may differ as to the policy which ought to be pursued under various circumstances, or the regulations which it may be expedient to adopt, and those who are appointed to act in such cases must be prepared to explain and defend their conduct at the proper time and place.

During the progress of the Pharmaceutical Society, from its establishment up to the present time, a variety of attacks have been made upon the Council by querulous or discontented persons, who, under the pretence of exposing abuses, or advocating some measures of reform, have applied the caustic with no sparing hand, and endeavoured to raise discontent among the Members. These attacks have for the most part emanated either from anonymous writers, or from persons whose motives were so transparent and arguments so shallow as to be unworthy of notice. At each successive Anniversary the Council have presented their Annual Report, the Members have been called upon to express their opinions and offer suggestions, which have met with due attention; and on each occasion a vote of confidence has been passed. Why, then, it may be asked, is it proposed in the present instance to deviate from the course hitherto adopted—to notice an attack which may be regarded as one of a series, and which might, like its predecessors, have been passed over in silent contempt?

The mode in which slander should be dealt with depends upon two questions. First, From whom does it proceed?—Secondly, What is the nature of the imputation?

In the present case the slander is circulated on the authority of a member of the Council, and purports to represent the views and principles of a small committee in which he takes a prominent part. The imputation is an impeachment of the honesty, integrity, and capacity of the Council, which impeachment, if founded on fact, would stamp the accused as persons destitute of principle, and totally unworthy of the confidence of the Members.

The parties concerned in the movement have done and are doing everything in their power to injure the Pharmaceutical Society, by misrepresentations at the Home Office and elsewhere — by urging the Members to withhold their support—by threats of defiance in a court of law—and by other acts of hostility calculated to embarrass the proceedings of the Council and interfere with the successful operation of the Pharmacy Act. In the first instance their abuse was levelled at the Editor of the Pharmaceutical Journal, whom they designate as "the common enemy of every Chemist and Druggist in the kingdom," "the recognized artful dodger of the Society," "the miserable shuffler," "the plausible Janus," "the Arch-jobber," &c. This is of no consequence; and, if they had gone no further, would not have been noticed. The Professors of the School of Pharmacy have in turn received their share of castigation. Dr. Pereira, whose services to the Society should always be remembered with respect and gratitude, did not escape; and the annoyance relating to the piratical publication of his lectures was not a little increased by the sanction given to the

proceeding by two members of the then Council, who refused to join in the disclaimer, and openly deplored the existing state of the law which prohibited the piracy. The hostility of these parties to the School of Pharmacy and those connected with it—their systematic opposition to the proceedings of the Council—and their abuse of every person holding a prominent position, or taking an active part in promoting the objects of the Society, have been persevered in up to the present time. The crime of attending a few meetings in the Country for the purpose of giving information respecting the Society and the Pharmacy Act, has been sarcastically stigmatized, and attributed to dishonest motives.

Even this opposition and these personalities might have been passed over, but, emboldened by the forbearance hitherto manifested, the parties concerned in this hostile movement have attacked the President, Vice-President, and Council in their official capacities, and having denounced them as tools and jobbers, and accused them of falsehood, imbecility, and dishonesty; they openly avow *their own* determination to "supersede the Pharmacy Act" and "that hybrid institution in Bloomsbury Square," and to involve the Society in hostilities in a court of law.

There is a limit beyond which forbearance would denote pusillanimity, and silence might be construed into an admission of inability to rebut or reply; and in the opinion of the Council this limit has been passed. The Council consider that the conduct above adverted to is incompatible with the position and functions of a representative appointed to manage the affairs and watch over the interests of the Society. They (the majority of twenty) being associated in their official capacity with one who is self-convicted of treachery against the Society, and who in his printed libels imputes to them base and corrupt motives, imbecility, falsehood, and dishonesty, have called the Members together for the purpose of placing them in possession of the facts of the case, and taking the sense of the meeting upon the subject.

The Society is a voluntary one, and from the nature of its constitution and the powers conferred upon it by Parliament, its prosperity and its beneficial influence on the position and character of the pharmaceutical body will mainly depend upon the judicious and harmonious co-operation of those for whose improvement the Act was passed, and on whom rests the responsibility of carrying it into effect. If there be a few Members who are dissatisfied with the Society, its laws, its management, and everything connected with it, they may retire from an institution with which they have no sympathies, and from which, therefore, they can derive no benefit—leaving those who entertain an opposite opinion to carry on the affairs of the Society unmolested. If they will neither retire nor desist from an opposition factious, vexatious, and detrimental to the interests of the Society, the Charter provides a remedy—namely, the power of expulsion, which, although vested in the Council, ought not to be exercised except in extreme cases, and in accordance with the known sentiments of the Members at large.

It is on this ground that an appeal is made to the Members, who, if they feel interested in the prosperity of the Society, and desirous to promote the objects for which they have been striving for many years, and which the Pharmacy Act was designed to accomplish, will see the importance of attending the meeting and supporting such resolutions as may be in accordance with their sentiments.

REFORM IN THE QUALITY OF DRUGS AND CHEMICALS.

The subject of the following communication is one which is frequently referred to in this Journal, and of which it is the especial province of the Pharmaceutical Society to take cognizance. We have appended a few comments to the suggestion of our correspondent, not with a view of detracting

from its merits, but for the purpose of supporting his arguments, and showing in what manner the means already at command may be made available for the object desired.

IMPURE OR ADULTERATED DRUGS, &c.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—To you, as the Editor of the recognized medium of communication of Pharmaceutical Chemists in this country, I address the following observations on the present disgraceful state of the chemical and drug markets. I have just passed the examination of the Society, and am now in business for myself; so now I can *feel* what a disgrace rests on us, unless we at once grapple with the hydra: if we cannot destroy it, let us so wound it that in future it will be nearly harmless.

It is now a patent fact that wholesale houses supply our trade with any description of articles *they* please. It was well known long since that a prescription made up at *one* house was different in appearance to that made up at another—that Mr. *Smith's* powdered drugs were different to Mr. *Jones's*. Yet both would say that they obtained them from highly respectable houses. You, yourself, Mr. Editor, know the constant communication that you have had concerning sophistications of chemicals, extracts, cod-liver oil, &c.; in fact, nearly all the articles in Materia Medica and Chemistry. Then *The Lancet* comes forward and states that eighty out of one hundred Druggists are selling *compound* articles instead of *genuine*. Our customers see this, and lose confidence in us. We cannot help it; we buy of *respectable houses*. The end is, we lose our good name, although we ourselves have been perfectly innocent of any intention of supplying anything but a genuine article. I have frequently heard the wholesale recipe for making *genuine Bee's-wax*, the component parts of *powdered tartaric acid*, &c.; and since I have been in business I have been supplied with *oxide of zinc*, which was *pure* white, *effervesced* on the addition of hydrochloric acid, and contained a *large percentage of lime*. When I complained of it, I was answered that "*It was the usual article supplied to the trade.*" By what strange art you can convert zinc into lime I do not know, unless our wholesale friends have learned it from the scientific recreations of our middle-age ancestors. Now, I say is not this too bad? and oxide of zinc echoes *Yes!*

Now that I have stated my grievance, let me show my brother Pharmaceutical Chemists my idea of a cure. Let us form ourselves into a "*Pharmaceutical Reform Association*," the subscription to which shall be a guinea, 10*s*., 5*s*., or any sum to pay working expenses;—let us be presided over by a man in whom we have confidence;—let us have a Secretary whose business it will be to perform the usual duties of that office, and at the same time to be thoroughly qualified to analyze any drugs or chemicals sent to him;—let us have a pamphlet published every month, or every three months, with the names of adulterated drugs, and the names of the wholesale houses supplying them;—let us send to our scientific Secretary all adulterated articles, and likewise the simplest correct tests that we may discover, so that by means of the pamphlet every member will have the most approved tests for every article in his shop, so that not only will our pamphlet be a *true* "Analytical Commissioner," but it will be a valuable literary treasure to all engaged in Chemistry and Pharmacy.

Such is my idea. To older heads and keener minds I leave the scheme; they, as practical men of business, will see its weak points and improve them; but, brother Pharmaceuticals, whether you discard my proposition or not, depend upon it, unless we ourselves reform the drug and chemical markets, the Government will institute a censorship over our drawers and bottles; then it will be too late to talk about "the liberty of the subject Pharmaceutical."

To the wealthy members of our body I appeal to support this good cause; you are the ornaments of our professional trade; you have instituted the Society and raised the status of the Pharmaceutical Chemist; now go a step further, and raise his trade with him.

To those members who are not so elevated, I say join this reform. You may think that your talents are not duly appreciated, and that this is the reason of your want of success; but perhaps the real reason is that your drugs and chemicals are not quite "the thing," so that by assisting the reform you will give your business another chance of improving itself.

To those Members of the Society who have been so particular about the wording of an Act of Parliament, thinking that its tendency might injure our body, to you, I say, support the reform; in this you may go heart and soul, for do little or much you must do good to us all, without the chance of doing us an injury.

Brother Pharmaceutical Chemists, we have made *one* move in the right direction by the passing of the Pharmaceutical Bill. Last year will be famous in our annals for that: let the present year see the inauguration of another movement second only to the one which has preceded it. We, perhaps, may not so soon feel the full effects of the reform, but posterity will say that *we in our generation did our duty.* I am, Sir, faithfully yours,

114, *High Holborn*, *August* 17, 1853. GEORGE LONG.

While we agree in many of the remarks of our correspondent, we think he attributes to the wholesale Druggists more blame than they deserve. It is true that inferior drugs and chemicals are sold. It is no less true that these articles are sometimes fabricated systematically for the market. And why is it so? The purchasers desire cheap drugs, the vendors compete with each other, and regulate the quality by the price. If one ask 2*s.* a pound for a drug which is offered by another at 1*s.* 4*d.*, he may expect a very limited sale. The difference in price is sometimes accidental. One has purchased a stock when the drug was cheap, another was out of stock and obliged to buy at an advanced price. In the case of another drug the positions of the two parties may be reversed. The retail Druggist naturally buys at what he considers the best market, and price is, of course, an element in his decision. But when a drug or chemical is offered at a price at which it cannot be produced, the fact may be taken as *primâ facie* evidence that it is not what it ought to be. It is in these cases that the undue desire for cheap medicines encourages the practice of fabrication, or the substitution of one thing for another. It is not fair, therefore, to throw *all* the blame on the manufacturer or wholesale Druggist, when he suits his commodities to the demand, and acts in accordance with "the custom of the trade."

Then who is to blame? the retail Druggist in part, for he purchases that which is prepared according to the price paid. For example: the manufacturers keep oxide of zinc, "P. L.," which is pure; and oxide of zinc "according to the custom of the trade," which contains a proportion of carbonate, and effervesces on the addition of an acid. The price of each corresponds with the quality. The purchaser takes his choice. The difference is well known, and any person who buys the ordinary article has no right to blame the person who sells it to him, unless he ordered the pure and paid pure price. The purchaser of cheap stock may plead by way of extenuation that he is not aware of the cost of producing the various drugs or preparations which he purchases. In judging of those which cannot be tested by chemical analysis he may be mistaken; he trusts to their general appearance and sensible properties, and the character of the house with which he deals; yet, unawares, he may be restricting the price below "genuine point." He also is under an obligation to meet the demand; his customers will have cheap drugs; they know little or nothing about their quality and "the custom of the trade," and they are not fully sensible of the serious consequences of disappointment from defective quality. They, therefore, do their part towards upholding the system by originating the demand for medicines at prices at which they cannot be furnished genuine.

It must be admitted that the responsibility of encouraging and keeping up this system is shared by *three* classes of persons—*the public*, who are the con-

sumers; *the retailers*, who supply the public; and the *manufacturers* or *merchants*, as the case may be, who supply the retailers. The remedy for the evil, to be effectual, must be brought to bear upon each of the three classes. Who, then, should take the lead in the work of reform? Not the public, for they are not initiated with regard to the tests of quality or the difference between good and bad; not the manufacturers or merchants, for their customers are presumed to understand their business, they buy with their eyes open, and ought to know what they buy; those who supply them act under instructions, and furnish what is ordered according to price. The parties who ought to introduce the reform, and *the only parties who can do it*, are the Pharmaceutical Chemists; they occupy a position between the producer and the consumer, and have it in their power to influence both, by insisting on being supplied with genuine goods on one side, and by exposing on the other the fallacy of the popular notion that the lowest-priced medicines are the cheapest.

In suggesting the formation of a "Pharmaceutical Reform Association," Mr. Long appears to forget that there is one already formed, and his own letter affords an illustration of the mode in which the Pharmaceutical Society is gradually promoting the object he has in view. A young man who has passed the examination feels that he has acquired a status in the business. In the course of his studies, while preparing for the examination, his attention has been directed to the quality of drugs and chemicals, and the mode of detecting adulterations. The importance of the subject is thus forced upon him, and he enters his profession with the conviction that it is something more than a mere trade, and with the desire to do his part towards emancipating it from the obloquy which he finds to exist. This is the natural result of improved qualification, and we are acquainted with many young men who have commenced their career as Pharmaceutical Chemists with ideas similar to those expressed by Mr. Long.

The proposal of our correspondent to invest the Secretary with the duty of analysing all adulterated drugs sent him by the Members, would involve more labour than any individual could accomplish. This, however, would not be necessary except in a few cases, and facilities already exist for conducting chemical analyses in the laboratory of the Society, when any question arises which requires investigation, and in which the Members are likely to be generally interested. Such researches furnish materials for discussion at the meetings and for publication in the Transactions of the Society.

The mode in which the reform in the quality of drugs and chemicals is likely to be promoted, consists in the general diffusion of knowledge on the subject, and the distinction conferred by Parliament upon the class of persons who have undertaken to introduce reform, and to whom the designation of Pharmaceutical Chemist will henceforth be applied.

The Members of the Pharmaceutical Society *profess* to aim at a high standard of proficiency, they *profess* to have associated themselves together for the purpose of advancing their art and profession, and establishing an examination as a test of qualification, and they claim on this ground the confidence of the public. Their appeal for the recognition of the legislature has been favourably responded to. *Let them act up to their professions*, and prove that they are worthy of the confidence to which they aspire. The result rests with themselves; and if they continue true to their principles, the profession and the public will recognize the title of Pharmaceutical Chemist as a guarantee of qualification to dispense the prescriptions of Medical men, and as a security for the supply of genuine medicines. The distinction between themselves and unqualified Chemists and Druggists will then be recognized. They will be able to obtain a fair remuneration for their labour, and will no longer be obliged to compete in price with persons who pay no attention to quality. The accomplishment of this result will be a work of time; but some advance has already been made, the influence of the Society is gradually increasing, and it will ultimately bring about that reform which is so much required not only in the qualifications of Pharmaceutical Chemists, but also in the quality of their drugs and chemicals.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

SPECIAL GENERAL MEETING.

A series of statements have been made and published impugning the honesty and integrity of the President and Council of the Pharmaceutical Society, in reference to the Bye-laws and the general Management of the Establishment. These statements have been published with the name and on the authority of a member of the Council, and may be supposed to derive from this circumstance some degree of importance, which would not otherwise belong to allegations of that nature. The President, therefore, felt it to be his duty to call the attention of the Council to the subject at a meeting held on the 3rd of August. The allegations in question being coupled with an avowed determination to involve the Society in litigation and other hostile proceedings, the Council considered such conduct to be incompatible with the position and functions of a representative appointed by the Members to watch over and protect the interests of the Society. With a view of arriving at a satisfactory and harmonious conclusion, the Council resolved to refer the case to the Members at large, by whose decision they desire to regulate the course to be adopted; in accordance with which resolution,

A SPECIAL GENERAL MEETING

of the Members will be held at the house of the Society, on Tuesday, September 6th, at eleven o'clock for twelve precisely, to take into consideration the statements and allegations referred to, and to pass such resolutions as may be deemed expedient.

LIST OF MEMBERS AND ASSOCIATES.
(*Continued.*)

MEMBERS.

London	Ambrose, John	1, Charlotte Street, Whitechapel
	Beecher, Martin J. K.	27, High Street, Portland Town
	Becket, Wm. Edward	6, Giltspur Street
	Cooper, Robert H.	20, Royal Exchange
	Cripps, John	8, Union Terrace, Notting Hill
	Golding, William	42, Upper Albany Street
	Gulliver, William	33, Lower Belgrave Street
	Laugher, Charles H.	Camden Town
	Lidwell, Joshua E.	46, Notting Hill
	Long, George	114, High Holborn
	Marshall, Thomas	Clapham Road
	Watts, William M.	32, Whitecross Street
	Wood, Geo. Emilius	
Abergell	Ellis, William	
Bath	Commans, Robert D.	
	Smith, Francis	
Beverley	Hobson, Charles	
Bideford	Hogg, Thomas	
Billericay	Ketcher, Henry R.	
Brighton	Etherington, Thos. G.	
	Smith, William	
Bristol	Chapman, Henry	
Bury St. Eds.	Owles, Thomas	
Carmarthen	Jones, David	
Congleton	Henshall, John	
Crewe	Bromfield, William	
Cullen	Robertson, Thomas B.	
Derby	Marshall, John	
Diss	Bowles, Charles A.	
Dover	Cotterell, William H.	
Dundee	Cockran, Robert	
Dursley	Goodrich, George	
Epping	Rowlands, William S.	
Forfar	Ranken, James A.	
Gateshead	Garbutt, Cornelius D.	
Glasgow	Currie, John	
	Fraser, Daniel	

GOOLE.....Briggs, George
HADDINGTON .....Watt, James
HANDSWORTH ...Hues, James J.
HASTINGS .....Smith, William
HOLLMWOOD .....Garlick, John
HUDDERSFIELD ...Chaplin, Joseph
HULL ....Pickering, Atkinson
HYTHE (Hants)...Holt, Thomas
INVERARY .....Macdonald, Daniel J.
LANCASTER.....Wearing, William
LEE .....Green, Josiah J.
LINCOLN .....Allsop, Francis John
LITCHFIELD .....Pipe, Frederick W.
LIVERPOOL.....Flinn, John J.
Green, William M.
Jackson, Henry
LIVERPOOL.....Miller, William
Rains, Alfred
Tiernan, Robert
Walker, John D., jun.
Walker, Thomas D.
LLANDOVERY .....Davies, David
MAIDSTONE.....Rogers, Henry
MANCHESTER.....Hinchcliffe, Farrand
MIDDLETON .....Sowter, W. Baxter
MORLEY .....Jackson, John
NEWCASTLE .....Hutchinson, James
NEWPORT (Mon.) Evans, Wm. Downing
Gillman, Thomas R.
NORWICH .....Greenhill, John R.
NOTTINGHAM.....Waterall, George
OLDHAM .....Mitchell, James
PAISLEY .....Hatrick, Robert
PARTICK .....Rait, Robert C.
PATER .....Laen, William
PERTH..... ...Young, John
RAMSGATE .....Lane, Joseph
RHYL .....Jones, E. Powell
ROME .....Whitburn, August. R.
ROTHERHAM .....Booth, Nathaniel
RUGBY.....Hannell, Edward W.
SALFORD .....Howroyd, Joseph
SEACOMBE .....Holt, Richard W.
SHELTON .....Crapper, John S.
SIDMOUTH .....Edwards, William
SOUTHAMPTON ....Sewell, John Holmes
SOUTHPORT .....Cumine, Frederick H.
SOUTHSEA .....Childs, James L.
SPALDING .....Hare, Josiah W.
STOCKPORT .....Appleby, William H.
SUNDERLAND. ....Heming, Robert
TUNBRIDGE .....Abbott, James W.
TYLDESLEY .....Brown, Thomas
WARMINSTER .....Toone, Joseph V.
WARRINGTON .....Sharp, Benjamin
WITHAM.....Capel, Alfred P.
WOOLWICH.....Parkes, John C.
WORCESTER .....Pritchard, Evans

MAJOR EXAMINATIONS.

*Argles, John .....Maidstone
Baly, James ....Warwick
Bishop, Alfred .....Ludlow
Botham, William .....Salford
Campbell, Edward D. ...Sunderland
Edman, Bonner .....Lincoln
*Field, George.....Birmingham
Gowing, James J. W. ...Yarmouth
Herring, George .....Doncaster
Isaac, G. Washington ...Clifton
Jefferson, Ebenezer W...Beccles
Kendall, Charles F. .....Scarborough
Kiddle, William L. .....Bath
King, Thomas .....Wendover
Kingdon, Wm. Youden...Dover
*Kirkman, George B.....Clapham
Lewis, Thomas C.....Ironbridge
Linford, John .....Canterbury
*Mac Intyre, Peter Slater Warkworth
Marshall, Robert .....Boston
Parkes, John Prior .....Nantwich
Peake, James... .....Dover
Peake, Henry .....London
Philipps, Wm. Thomas...Carmarthen
Picnot, Charles.....Rochester
Prowse, Charles .....Bristol
Rainey, Edward.....Spilsby
*Robertson, Thomas B. ...Cullen
Rowntree, Thomas .....London
*Scott, Thomas .....Birmingham
Scott, George.....Edinburgh
Southworth, Robert .....Preston
Taylor, Charles .....Birmingham
Thompson, Wm. Austin Carlisle
Thompson, Henry .....Letherhead
Wheeler, Christopher ...Evesham
Wilson, Joseph .....Penrith
Williams, Terrick J.....Manchester

MINOR EXAMINATIONS.

*Bailey, Henry .....Bexley Heath
*Balkwill, Fred. Pryor ...Plymouth
*Beveridge, James Martin Woolwich
*Butt, Edward Northway Newbury
*Cracknell, Benjamin ...Halesworth
*Johnson, George .....Birmingham
Jones, Richard Finden Oxford
*Long, Henry .....London
*Tasker, William .....London
*Tibbs, Frederick .....Sittingbourne
*Todd, Thomas ... .Edinburgh

* Honorary Certificates.

In the list published last month, the name of J. E. Jennings should have had an asterisk before it.

R. Heming, Margate, in the same list, is at present of Bishop Wearmouth, Sunderland.

ORIGINAL AND EXTRACTED ARTICLES.

WHAT IS A "FLUID POUND?"

I BEG to refer you to an ambiguity that appears to me to occur in the last edition of the Edinburgh Pharmacopœia, in the formula for Syrupus Tolutanus; and I trust it will need no apology on my part, in calling your attention to the above subject, as I have not observed any notice of it hitherto.

Apart from the absence of uniformity in the Pharmacopœias at present in use, it must be of more than usual importance that the formulæ should have only one construction, as regards the quantities of ingredients; and that the learned compilers have allowed an ambiguity very considerable to enter their work, I think will be apparent on examining this case, as follows, viz.:—Take of

Simple syrup, two pounds.
Tincture of tolu, one ounce.

I may observe, that it will not be possible to find in the Introduction to the Pharmacopœia any intimation regarding the quantity of liquid which shall form a fluid pound. Therefore, What is the quantity of simple syrup given as two pounds?—is it to be determined by weight? Whatever may have been the intentions of the College here, their instructions on this point are clearly made manifest, that liquids shall be ascertained by the standard of imperial measure; nor is there any prohibition in their work to this being done in every instance. In order that this point may be quite certain, I quote from their Preface, as follows:—"In former editions we directed that the quantities of fluids, as well as solids, should be determined by weight. Measurement, however, is so much more convenient for fluids, that, in practice, it will always be followed; and we have, therefore, adopted, in the present Pharmacopœia, the system of measures of the Royal College of Physicians of London," &c.; and that these shall consist of minim, fluid-drachm, fluid-ounce, pint, and gallon. And again it is said, "The substitution of measures instead of weights, for ascertaining the quantity of fluids," &c., make it evident that all liquids require to be measured, in conformity with these regulations. And here lies the difficulty in the present case, how much by measure is a pound? Shall we consider it as f℥xij., f℥xvj., or f℥xx, the pint imperial?—since these or other quantities might be used in the absence of any Pharmacopœia definition.

The same remarks apply to Syrupus Zingiberis, in the formula for Elect. Opii.

These inadvertencies of our authorities in compounding, which may only be a remnant of the old system of weighing everything, are the more to be deplored, as many of the medical profession imagine that the Pharmacopœia is explicit with regard to a liquid pound; and which is the less easily to be ignored, however anxious we may be to have more certain indications, seeing that it is made use of in the Edinburgh publication.

I may also observe, that in the formula for Enema Cathartica the quantity of olive oil is stated as one ounce, while in that of unguentum citrinum, ceratum, and unguentum simplex, emplastrum lythragyri, and many more, it is called "*fluid-ounces.*" Does this imply that the first is to be determined by weight, as opposed to their own declaration, while the others are by the standard of imperial measure?

JAMES MURDOCH.

143, *Sanchiehall Street, Glasgow, August 18th*, 1853.

ON THE DETERMINATION OF THE STRENGTH OF PHARMACEUTICAL PREPARATIONS CONTAINING HYDROCYANIC ACID.

BY MR. JAMES ROBERTON.

Of all medicinal preparations there are none which are more liable to variation of strength, and none which require greater care in their preservation, than those which contain hydrocyanic acid. From recent examinations it has been found, that in that particular preparation known as Scheele's acid, these variations have ranged from 4 to 5 per cent. And in the aq. lauro-cerasi I have sometimes failed in detecting the presence of the acid beyond the slightest trace.

In medical practice the evil attending such a want of uniformity in such a remedy is at once apparent.

To the Pharmaceutist the possession of a reliable test for ascertaining from time to time the actual condition of such compounds is of great practical value. For accuracy of determination and ready application I am unacquainted with any means so useful as the cyanometric process, proposed by MM. Fordos and Gélis for the estimation of the commercial value of cyanide of potassium, founded upon the reaction of iodine upon the cyanides, and which consists in the absorption of the iodine up to the point of saturation, beyond which the free iodine becomes immediately apparent.

In the practical use of this test it is only necessary to arrive at the true standard of strength of the several pharmaceutical preparations containing prussic acid. A test solution of iodine, of a definite strength, is then prepared (three grains to the ounce answers very well), which may be put into a Gay-Lussac's pouret, from which it is dropped into a certain quantity of the liquid under examination, till a permanent yellowish tinge becomes visible, when the quantity employed is read off from the graduated scale and the strength of the preparation at once determined. The process gives not only the comparative value but the actual percentage of hydrocyanic acid present, as every equivalent of cyanogen absorbs one equivalent of iodine. I have found this process of great practical utility, and recommend it for the adoption of my fellow-Pharmaceutists.

Manchester.

ON THE ELECTRICAL RELATIONS OF IRON AND COPPER IN VARIOUS LIQUIDS AT DIFFERENT TEMPERATURES.

BY MR. G. GORE.

In all the following experiments, the arrangement for testing the electrical relations of those metals to each other, consisted of a test-tube containing the liquid to be examined, into which clean copper and iron wires, one-tenth of an inch in diameter and one-fourth of an inch asunder, were vertically immersed to the depth of three inches, and connected with a galvanometer, the heat being applied by a small spirit-lamp and water-bath.

Experiment 1.—With a saturated solution of boracic acid in distilled water, iron was electro-positive to copper, the deflection being 12 at 20° C.; by applying heat it became more positive, the deflection being 30 at 100° C.

Exp. 2.—Strong hydrocyanic acid at 21° C., copper was positive to iron, the deflection being 5, which increased to 19 at 100° C.

Exp. 3.—Equal measures of strong hydrocyanic acid and distilled water, copper was positive, deflection $\frac{1}{2}$ at 24° C., and 10 at 100° C.

Exp. 4.—Saturated aqueous solution of sesquicarbonate of ammonia, copper positive, deflection 13 at 22° C., and 38 at 90° C.

Exp. 5.—Saturated aqueous solution of sulphate of ammonia, iron positive, deflection 19 at 22° C., and 30 at 100° C.

Exp. 6.—Saturated aqueous solution of hydrochlorate of ammonia, iron positive, the deflection being 11 at 22° C., and 25 at 100° C.

Exp. 7. Saturated aqueous solution of nitrate of ammonia, iron positive, deflection 11 at 22° C., and 32 at 100° C.

Exp. 8.—Nearly saturated aqueous solution of acetate of ammonia, iron positive, deflection 1 at 23° C., and 40 at 80° C.

Exp. 9.—Strong aqueous solution of caustic potash, iron positive, deflection 2 at 24° C., and 12 at 100° C.

Exp. 10.—Saturated aqueous solution of carbonate of potash, iron positive, deflection 11 at 21° C., and 20 at 100° C.

Exp. 11.—Strong aqueous solution of "liver of sulphur," copper positive, deflection 30 at 22° C.

Exp. 12. Saturated aqueous solution of sulphite of potash, iron positive, deflection 16 at 21° C., and 32 at 100° C.

Exp. 13.—Saturated aqueous solution of sulphate of potash, iron positive, deflection 11 at 21° C., and 18 at 100° C.

Exp. 14.—Nearly saturated aqueous solution of iodide of potassium, copper positive, deflection 3 at 21° C., 7 at 50° C., and 2 at 70° C., then iron positive, deflection 3 at 80° C., and 16 at 100° C.

Exp. 15.—Saturated aqueous solution of chloride of potassium, iron positive at 15° C.

Exp. 16.—Saturated aqueous solution of chlorate of potash, iron positive, deflection $13\frac{1}{2}$ at 22° C., 24 at 90° C., at 2 at 100° C.

Exp. 17.—Saturated aqueous solution of nitrate of potash, iron positive, deflection 8 at 21° C., and 24 and 100° C.

Exp. 18.—Saturated aqueous solution of bichromate of potash, iron positive, deflection 1 at 19° C., and 12 at 100° C.

Exp. 19.—Saturated aqueous solution of ferrocyanide of potassium, copper positive, deflection $3\frac{1}{2}$ at 21° C., and 26 at 100° C.

Exp. 20.—Strong aqueous solution of cyanide of potassium, copper positive, deflection 38 at 20° C., and 48 at 95° C.

Exp. 21.—Saturated aqueous solution of commercial oxalate of potash, iron positive, deflection 6 at 20° C., and 30 at 100° C.

Exp. 22.—Saturated aqueous solution of acetate of potash, copper positive, deflection $2\frac{1}{2}$ at 21° C., and 20 at 100° C.

Exp. 23.—Strong aqueous solution of citrate of potash, iron positive, deflection 6 at 20° C., and 30 at 100° C.

Exp. 24.—Saturated aqueous solution of tartrate of potash, iron positive, deflection 2 at 20° C., and 26 at 100° C.

Exp. 25.—Saturated aqueous solution of bitartrate of potash, iron positive, deflection 24 at 19° C., and 40 at 100° C.

Exp. 26.—Strong aqueous solution of caustic soda, iron positive, deflection 6 at 20° C., and 20 at 100° C.

Exp. 27.—Saturated aqueous solution of bicarbonate of soda, iron positive, deflection 11 at 20° C., and 23 at 100° C.

Exp. 28.—Saturated aqueous solution of borate of soda, iron positive, deflection 11 at 21° C., and 23 at 100° C.

Exp. 29.—Saturated aqueous solution of diphosphate of soda, iron positive, deflection 7 at 20° C., and 21 at 100° C.

Exp. 30.—Saturated aqueous solution of dry dipyrophosphate of soda, iron positive, deflection 4 at 20° C., and 22 at 100° C.

Exp. 31.—Saturated aqueous solution of crystallized dipyrophosphate of soda, iron positive, deflection 11 at 20° C., and $25\frac{1}{4}$ at 100° C.

Exp. 32.—Saturated aqueous solution of hyposulphite of soda, copper positive, deflection 8 at 20° C., and 29 at 100° C.

Exp. 33.—Saturated aqueous solution of sulphate of soda, iron positive, deflection 10 at 20° C., and 27 at 100° C.

Exp. 34.—Saturated aqueous solution of chloride of sodium, iron positive, deflection 4 at 21° C., and 24 at 100° C.

Exp. 35.—Saturated aqueous solution of nitrate of soda, iron positive, deflection 4 at 21° C., and 22 at 100° C.

Exp. 36.—Saturated aqueous solution of ammonio-phosphate of soda, iron positive, deflection 12 at 21° C., and 27 at 100° C.

Exp. 37.—Saturated aqueous solution of oxalate of soda, iron positive, deflection 6 at 22° C., and 24 at 100° C.

Exp. 38.—Saturated aqueous solution of acetate of soda, copper positive, deflection $1\frac{1}{2}$ at 21° C., and 9 at 90° C.; then iron positive, deflection 13 at 100° C.

Exp. 39.—Saturated aqueous solution of citrate of soda, iron positive, deflection 6 at 21° C., and 26 at 100° C.

Exp. 40.—Saturated aqueous solution of tartrate of soda, iron positive, deflection 14 at 20° C., and 47 at 100° C.

Exp. 41.—Saturated aqueous solution of tartrate of potash and soda, iron positive, deflection 6 at 21° C., and 20 at 100° C.

Exp. 42.—Saturated aqueous solution of chloride of barium, iron positive, deflection 8 at 20° C. and 28 at 100° C.

Exp. 43.—Saturated aqueous solution of nitrate of baryta, iron positive, deflection 36 at 20° C., and 25 at 100° C.

Exp. 44.—Saturated aqueous solution of nitrate of strontia, iron positive, deflection 12 at 20° C., and 31 at 100° C.

Exp. 45.—Saturated aqueous solution of sulphate of magnesia, iron positive, deflection 3 at 20° C., and 16 at 100° C.

Exp. 46.—Saturated aqueous solution of "potash alum," iron positive, deflection 8 at 21° C., and 30 at 100° C.

Exp. 47.—Nearly saturated aqueous solution of sulphate of zinc, iron positive, deflection $3\frac{1}{2}$ at 22° C., and 18 at 100° C.

Exp. 48.—Saturated aqueous solution of chloride of zinc, iron positive, deflection 2 at $24\frac{1}{2}$° C., and 40 at 100° C.

Exp. 49.—Saturated aqueous solution of nitrate of zinc, iron positive, deflection 4 at $22\frac{1}{2}$° C., and 41 at 100° C.

Exp. 50.—Saturated solution of unignited zinc oxide in strong aqueous ammonia, copper positive, deflection 6 at $21\frac{1}{2}$° C., and 22 at 40° C.

Exp. 51.—Saturated solution of carbonate of zinc in strong aqueous ammonia, copper positive, deflection 1 at $23\frac{1}{2}$° C., and 20 at 100° C.

Exp. 52.—Saturated solution of borate of zinc in strong aqueous ammonia, copper positive, deflection 5 at $21\frac{1}{2}$° C., and 20 at 45° C.

Exp. 53.—Saturated solution of unignited zinc oxide in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 2 at $20\frac{1}{2}$° C., and 22 at 97° C.

Exp. 54.—Saturated solution of hydrate of zinc in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 6 at 40° C., and 30 at 80° C.

Exp. 55.—Saturated solution of carbonate of zinc in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 4 at 25° C., and 35 at 98° C.

Exp. 56.—Saturated solution of borate of zinc in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 6 at $21\frac{1}{2}$° C., and 28 at 80° C.

Exp. 57.—Saturated solution of phosphate of zinc in strong aqueous sesquicarbonate of ammonia, iron positive, deflection 14 at 22° C., and $15\frac{1}{2}$ at 60° C.; then copper positive, deflection 25 at 76° C.

Exp. 58.—Saturated solution of pyrophosphate of zinc in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 4 at 22° C., and 24 at 80° C.

Exp. 59.—Saturated solution of ignited zinc oxide in strong aqueous sesquicarbonate of ammonia, iron positive, deflection $16\frac{1}{2}$ at 22° C., and 30 at 1000° C.

Exp. 60.—Saturated solution of carbonate of zinc in strong aqueous caustic potash, iron positive, deflection 8 at 22° C., and 15 at 100° C.

Exp. 61.—Saturated aqueous solution of acetate of zinc, iron positive, deflection 8 at 22½° C., and 30 at 100° C.

Exp. 62.—Saturated aqueous solution of chloride of copper, iron positive, strongly at 20° C., and at 100° C.

Exp. 63.—Saturated aqueous solution of nitrate of copper, iron strongly positive at 20° C., and at 100° C.

Exp. 64.—Saturated aqueous solution of ammoniuret of copper, copper positive, deflection 17 at 22° C., and 38 at 90° C.

Exp. 65.—Saturated solution of borate of copper in strong aqueous ammonia, copper positive, deflection 19½ at 23° C., and 30 at 70° C.

Exp. 66.—Saturated solution of phosphate of copper in strong aqueous ammonia, copper positive, deflection 30 at 18° C., and 35 at 50° C.

Exp. 67.—Saturated solution of pyrophosphate of copper in strong aqueous ammonia, copper positive, deflection 34 at 18° C., and 42 at 96° C.

Exp. 68.—Saturated solution of protoxide of copper in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 30 at 18° C., and 43 at 90° C.

Exp. 69.—Saturated solution of borate of copper in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 19½ at 22½° C., and 30 at 70° C.

Exp. 70.—Saturated solution of phosphate of copper in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 29 at 19° C., and 42 at 90° C.

Exp. 71.—Saturated solution of pyrophosphate of copper in strong aqueous sesquicarbonate of ammonia, copper positive, deflection 6 at 18° C., and 41 at 95° C.

Exp. 72.—Saturated solution of ammoniuret of copper in strong aqueous ammonia, copper positive, deflection 32½ at 21½° C., and 40 at 95° C.

Exp. 73.—Saturated solution of protoxide of copper in strong aqueous sulphate of ammonia, iron positive, deflection 23 at 27° C., and 48½ at 70° C.

Exp. 74.—Saturated aqueous solution of equal weights of the sulphates of copper and ammonia, iron positive, strongly at 20° and 100° C.

Exp. 75.—Saturated solution of protoxide of copper in strong aqueous hydrochlorate of ammonia, iron positive, deflection 46 at 20° C., and 50 at 100° C.

Exp. 76.—Saturated aqueous solution of equal weights of hydrated protochloride of copper and hydrochlorate of ammonia, iron positive, deflection 40 at 20° C., and 42 at 100° C.

Exp. 77.—Saturated solution of protoxide of copper in strong aqueous nitrate of ammonia, iron positive, deflection 32½ at 22½° C., and 48 at 80° C.

Exp. 78.—Saturated aqueous solution of equal weights of the nitrates of copper and ammonia, iron positive, deflection 30 at 20° C., and 15 at 100° C.

Exp. 79.—Saturated aqueous solution of protoxide of copper in strong aqueous carbonate of potash, copper positive, deflection 3 at 18° C., 15 at 70° C., and 10 at 95° C.; then iron positive, deflection 10 at 100° C.

Exp. 80.—Saturated aqueous solution of equal weights of the sulphates of copper and potash, iron positive, deflection 55 at 20° C., and 58 at 100° C.

Exp. 81.—Saturated aqueous solution of equal weights of protochloride of copper and chlorate of potash, iron positive, deflection 54 at 20° C., and 40 at 100° C.

Exp. 82.—Saturated aqueous solution of equal weights of the nitrates of copper and potash, iron positive, deflection 36 at 20° C.

Exp. 83.—Saturated solution of protoxide of copper in strong aqueous bicarbonate of soda, copper positive, deflection 3 at 18° C., 9 at 60° C., and 4 at 90° C.; then iron positive, deflection 10 at 100° C.

Exp. 84.—Saturated aqueous solution of equal weights of the sulphates of copper and soda, iron positive, deflection 34 at 20° C., and 45 at 100° C.

Exp. 85.—Saturated aqueous solutions of equal weights of protochloride of copper and chloride of sodium, iron positive, deflection 46 at 20° C., and 42 at 100° C.

Exp. 86. Saturated aqueous solution of equal weights of the nitrates of copper and soda, iron positive, deflection 30 at 22° C.

Exp. 87.—Saturated aqueous solution of equal weights of the nitrates of copper and baryta, iron positive, deflection 51 at 22° C.

Exp. 88.—Also of the nitrates of copper and strontia, iron positive, deflection 25 at 20° C.

Exp. 89.—Also of the sulphates of copper and magnesia, iron positive, deflection 53 at 20° C., and 50 at 100° C.

Exp. 90.—Also of the sulphates of copper and zinc, iron positive, deflection 40 at 20° C., and 45 at 100° C.

Exp. 91.—Also of the nitrates of copper and zinc, iron positive, deflection 38 at 20° C.

Exp. 92.—Also of the nitrates of copper and lead, iron positive, deflection 22 at 20° C.

Exp. 93.—Also of sulphate of copper and protosulphate of iron, iron positive, deflection 52 at 20° C.

Exp. 94.—Also of the protochlorides of copper and iron, iron positive, deflection 46 at 20° C.

Exp. 95.—Saturated aqueous solution of acetate of copper, iron positive, deflection 7 at 22½° C., and 35 at 100° C.

Exp. 96.—Saturated aqueous solution of equal weights of the acetates of copper and potash, copper positive, deflection 10 at 22° C., and 12 at 100° C.

Exp. 97.—Saturated aqueous solution of equal weights of the acetates of copper and soda, copper positive, deflection 10 at 23° C., 12½ at 60° C., and 2 at 95° C.; then iron positive, deflection 20 at 100° C.

Exp. 98.—Saturated aqueous solution of equal weights of the acetates of copper and zinc, copper positive, deflection 4 at 24° C., and ½ at 40° C.; then iron positive, deflection 1 at 70° C., and 35 at 100° C.

Exp. 99.—Saturated aqueous solution of the acetates of copper and lead, copper positive, deflection 6 at 23° C., and 2 at 70° C.; then iron positive, deflection 2 at 80° C., and 26 at 100° C.

Exp. 100.—Saturated aqueous solution of tartrate of copper, iron positive, deflection 30 at 22½° C.

From the foregoing experiments it appears that out of one hundred chemical liquids iron was electro-positive to copper in sixty-six of them, and copper electro-positive to iron in twenty-six, whilst in the remaining eight liquids the electrical relations of those metals varied with the alteration of temperature; from this result we are justified in concluding that the strength of affinity of iron for electro-negative substances is generally much greater than that of copper, and consequently that iron is generally more electro-positive than copper, and has its electrical condition more determined by the electro-negative elements of the liquid. In further support of this statement, it appears that in *every* case where either of those strongly electro-negative substances, sulphuric acid, nitric acid, hydrochloric acid, or chlorine formed the acid element, iron was electro-positive to copper, as may be perceived by referring to experiments 5, 6, 7, 13, 15, 33, 34, 35, 42, 43, 44, 45, 46, 47, 48, 49, 62, 63, 73, 74, 75, 76, 77, 78, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, and 94, which include all the liquids in which those substances were present: and even with those containing many of the weaker acids, as boracic, phosphoric, pyrophosphoric, sulphurous, chloric, chromic, oxalic, citric, and tartaric acids. Iron was also in every case electro-positive to copper, though less strongly, provided cyanogen, potassium, iodine, and ammonia, which have each a strong affinity for copper, were absent, as in experiments 1, 12, 16, 18, 21, 23, 24, 25, 28, 29, 30, 31, 37, 39, 40, 41, and 100: but with some others of the weaker acids, as carbonic and acetic acids, iron was sometimes positive and sometimes negative to copper, provided the substances above mentioned were absent: thus with carbonic acid present, iron was positive to copper in experiments 10,

27, and 60; but in experiments 79 and 83 copper was positive at low temperatures and iron at higher ones: also with acetic acid present in experiments 8, 61, and 95, iron was positive; but in experiments 22, 38, 97, 98, and 99, copper was positive at low temperatures and iron at higher ones; and in experiment 96 copper alone was positive.

It is further to be noticed that in nearly every case where cyanogen, potassium, sodium, or ammonia was present, provided none of the strong acids, as sulphuric, nitric, and hydrochloric acids, or chlorine were likewise present, copper was electro-positive to iron, thus in experiments 2, 3, 4, 11, 19, 20, 50, 51, 52, 53, 54, 55, 56, 64, 65, 66, 67, 68, 69, 70, 71, and 72, copper was positive to iron at all temperatures, and in experiments 14 and 57 copper and iron were alternately positive, whilst in those of 8, 36, and 59, iron was solely positive; these include all the cases present. From these results we draw the conclusion that copper has generally a stronger affinity than iron for cyanogen, potassium, sodium, and ammonia; but when these substances are united with any of the strong acids mentioned above, as in experiments 5, 6, 7, 15, 34, 73, 74, 75, 76, 77, 78, and 85, then in every case the superior affinity of iron for the electro-negative elements renders it electro-positive, and reverses the electrical conditions.

The great preponderance of affinity of cyanogen, potassium, sodium, and ammonia, and especially the two first for copper over iron, and indeed for most of the nobler metals over nearly all the baser ones, renders their compounds of singular value in the beautifully scientific process of electro-plating. Where the object is to deposit a nobler metal upon a baser one, and to provide a liquid in which the metal to be deposited will dissolve freely, and the article to receive the deposit will be unacted upon. It also elucidates a fact familiar to all electro-platers who are in the habit of hanging the dissolving plates of silver upon iron frames in the cyanide of silver and potassium plating solution, that whilst there is the smallest piece of silver upon the frame the whole of the current of electricity will enter the liquid through the silver and none through the iron, dissolving the former and leaving the latter untouched. Further, if an iron plate be substituted for the dissolving silver one in such a solution, the current of electricity will be nearly or wholly stopped, which shows that the apparent electric conductibility of a liquid depends not only upon its own specific nature, but also in a great measure upon the kind of material of which the electrodes are formed.

Birmingham, July, 1853.

RACEMIC ACID.

Racemic acid was first discovered by Kestner, a manufacturer of tartaric acid at Thann, in the department of the Vosges, in the year 1820. It was called thannic acid by its discoverer; but on its being found by Berzelius to have the same composition as tartaric acid, the name paratartaric acid was given to it; and this was subsequently changed by Gmelin to uvic acid, and by Gay-Lussac to racemic acid. In addition to these *aliases*, it has also been called vinic acid; but the name given to it by Gay-Lussac is that by which it is now generally designated by Chemists. Besides these frequent changes of name, its history presents another peculiarity. For nearly thirty years it was received by Chemists as a product derived exclusively from the grapes grown in the Upper Rhine and the Vosges, the district in which it was first discovered by Kestner, and it has been assumed by most chemical writers, that it was a constantly occurring product of the manufacture of tartaric acid from the tartar of those districts, but these representations have subsequently proved to have been entirely erroneous.

Until the year 1849, the interest attached to racemic acid was derived from the circumstances of its being isomeric with tartaric acid, and agreeing with that acid also in its origin, and in some of its characters and properties, while in

other respects it was clearly distinguished from it. Indeed, so different was it found to be from tartaric acid in some of its reactions, that on its first discovery it was mistaken for oxalic acid, and was actually sold as such.

The following are the principal characters by which racemic acid is distinguished from tartaric acid :—

Tartaric acid is soluble in rather less than its weight of cold water. When a ray of polarized light is made to pass through the solution, the plane of polarization of the ray is turned to the right. If the solution be added to lime water, or to a dilute solution of chloride of calcium, no immediate precipitate is formed, but after standing for some time, if the solutions have not been too dilute, a crystalline deposit of tartrate of lime takes place.

Racemic acid requires between five and six parts of cold water for its solution. When a ray of polarized light is made to pass through the solution, the plane of polarization of the ray is not altered. If the solution be added to lime water, or to a dilute solution of chloride of calcium, an immediate precipitate of racemate of lime is formed.

In 1849, greatly increased interest was excited in regard to racemic acid, by the results of the investigations of Pasteur, which were published in that year.

Pasteur discovered that racemic acid is a compound of two acids, one of which turns the plane of polarization of a ray of light to the right, and the other to the left; he therefore called them *Dextro-racemic acid* and *Levo-racemic acid.* These two acids enter into racemic acid in equal quantities. Their crystalline forms, which are identical in all their individual parts, are symmetrical polyhedrons, incapable of coinciding by superposition. The corresponding salts of these acids likewise exhibit the most striking analogies in their physical and chemical properties; the only difference between them consisting in the opposite directions in which they turn the plane of polarization of a ray of light, and in the symmetry in opposite directions, of their crystalline forms. Dextro-racemic acid is identical with ordinary tartaric acid.

If two equal quantities of racemic acid be neutralized, the one with soda and the other with ammonia, and the solutions mixed, the liquid by cooling, or by spontaneous evaporation, deposits a double salt, *racemate of soda and ammonia*, which, with care, may be obtained in well-defined crystals of considerable size. These crystals are rectangular prisms, having their lateral edges replaced by planes, and the intersection of two only of these planes with the terminal faces of the prism are replaced by facets; hence the crystals are hemihedral. On minutely examining these crystals one by one, it was found that they may be divided into two groups, the crystals in the one having the hemihedral facets oppositely but symmetrically situated to those in the other. The crystals of one of these groups turn the plane of polarization to the right; those of the other to the left. In other respects the crystals of the two groups are absolutely identical.

It is difficult to obtain a complete separation of the two kinds of crystals by merely picking them out; but after separating them in this way as well as possible, and drying them on bibulous paper to remove the adhering mother-liquid, complete purification may be effected by dissolving each kind of crystals in separate portions of water, and crystallizing again.

These two groups of crystals contain respectively *dextro-racemic acid* and *levo-racemic acid.* That the acid in the one group is different from that in the other, and that neither of them, taken alone, is the same as racemic acid, may be shown by dissolving a crystal from either group in water and adding a solution of a lime salt. If the solutions be somewhat dilute, no immediate precipitate will be formed, but after some time brilliant isolated crystals will appear, consisting of right rhombic prisms, passing into the octohedral form at the angles of the base. In short, the lime salt is precipitated with all the characters of tartrate of lime. The solutions of both kinds of crystals behave in the same way. But if, instead of taking separate crystals, two crystals belonging to

different groups be dissolved together, the precipitate with the lime salt, even in very dilute solutions, will form immediately or after a few seconds, in the state of an amorphous powder or of small thin luminæ, either isolated or arranged in stellated groups, according to the slowness of the precipitation—in short, presenting all the characters of racemate of lime.

Racemic acid, however, is not a mere mixture of dextro-racemic and levo-racemic acid, for every crystal of racemic acid, however small, gives, with a lime salt, the distinguishing character of racemate of lime. In fact, the two acids cannot exist together in a solution without *combining* and forming racemic acid. The same is the case with all the salts of these acids, excepting the double racemate of soda and ammonia already described, and the double racemate of soda and potash which is isomorphous with it.

Dextro-racemic acid and *levo-racemic acid* are obtained from their respective salts in the same way as tartaric acid would be obtained from a tartrate. If nitrate of lead or of lime be added to a solution of dextro-racemate of soda and ammonia, and the precipitate subsequently treated with sulphuric acid, a slight excess of the latter being used, dextro-racemic acid will be set free, which may be obtained in crystals if the solution be concentrated to a proper degree. Fine well-formed crystals may be thus obtained by slow evaporation. These crystals are oblique rectangular prisms, with hemihedral modifications. They are identical in every respect with ordinary tartaric acid. It is convenient, however, to retain the name *dextro-racemic acid* when we wish to refer to it as one of the constituents of racemic acid, or to contrast its properties with those of levo-racemic acid.

Levo-racemic acid is prepared in precisely the same way as the dextro-racemic acid. It has also the same composition, density, and solubility. The crystalline forms of the two acids are symmetrical, so that, although their faces are precisely the same in form, number, and magnitude, they cannot be made to coincide by superposition, just as the right hand, although similar to the left hand, cannot be superposed to it, so as to bring the similar parts together. While dextro-racemic acid, in common with ordinary tartaric acid, turns the plane of polarization of a ray of light to the right, levo-racemic acid turns it to exactly the same extent to the left. The chemical properties of these two acids are the same, being those of ordinary tartaric acid, and, therefore, levo-racemic acid might, without any impropriety, be called levo-tartaric acid.

The crystals of both these acids are strongly *pyro-electric*. Each crystal when heated or cooled becomes charged with opposite electricity at its two ends; but under these circumstances the direction of the positive and negative poles in a crystal of dextro-racemic acid is precisely opposite to that which occurs in a crystal of levo-racemic acid.

The relations of form, rotatory power, and chemical properties, already noticed in the dextro-racemic and levo-racemic acids are also found in the salts of these acids. All the chemical properties of the tartrates or dextro-racemates are reproduced, even in the minutest details, in the corresponding levo-racemates. To each dextro-racemate there corresponds a levo-racemate, differing only from the former in the position of the hemihedral facets and the direction of the rotatory power.

The publication of these very interesting results by Pasteur in 1849, excited increased interest among Chemists in reference to the history of racemic acid. In the inquiries which were made at this time by Pasteur, it was ascertained that instead of this acid being, as had been represented, a constantly occurring product in the district in which it was originally discovered, Kestner, the discoverer, had never met with it since 1820, and then only on one occasion. It now became a question whether, on the occasion referred to, the racemic acid resulted from the transformation of tartaric acid under some chemical agencies, or whether it was really a natural product.

Inquiries were instituted with reference to these points, and in 1851 the

Society of Pharmacy of Paris offered a prize for satisfactory answers to the following questions:—

1st. Are there any tartars which contain racemic acid ready formed?

2nd. What are the circumstances under which tartaric acid may be converted into racemic acid?

At this period racemic acid was only met with in collections of chemical products, where small specimens of it were carefully treasured. Towards the close of 1851, however, it was suddenly offered for sale in London by one of the wholesale dealers in chemicals.* The announcement of this fact in Paris appears to have created some excitement among the Chemists there, it being supposed that a new source or means of production had been discovered, but it was afterwards ascertained that this supply was of limited extent, that it had been obtained from Germany, and was, we believe, part of Kestner's original product.

About this period also Mitscherlich informed Pasteur that a manufacturing Chemist in Saxony, of the name of Fikentcher, prepared racemic acid, and Pasteur undertook a journey there to make further inquiries respecting it. He found that the racemic acid was then obtained in very small quantities only in the manufacture of tartaric acid, but that it had sometimes occurred in larger quantity when tartars from Trieste has been used.

Pasteur afterwards visited a manufactory near Vienna, where he also found racemic acid in small quantity among the crystals of tartaric acid.

From the inquiries thus made, Pasteur was led to consider that racemic acid is a natural product, existing in some but not in all the tartars from which tartaric acid is made: that it exists to a greater extent in the crude than it does in the half-refined tartars: that the tartars of Austria contain it, but in very small quantity: that the tartars of Naples contain it in larger quantity; and that those of Alsace and Burgundy either do not contain it at all, or in such small quantity that it is always left in the mother-liquors.

Since the publication of these investigations and conclusions, however, Pasteur has announced the very important fact, that he has succeeded in effecting the transformation of tartaric acid into racemic acid. The means by which this is done are not yet made public.

ON THE MANUFACTURE OF AMMONIA AND AMMONIACAL SALTS

(*Concluded from page* 68.)

A GREAT variety of processes have been patented within the last few years by Mr. Laming and Mr. Hills, having for their object the purification of coal gas and the obtaining of ammonia and ammoniacal salts. In his patent of November 4, 1847, Mr. Laming claims the use of the undermentioned salts for the above-named purposes, the solution of which is absorbed into sawdust, or other porous material, and placed in the purifying vessel of the gas-works—viz., chloride of calcium, the muriates and sulphates of manganese, iron, and zinc; the carbonates of manganese, iron, zinc, and lead. The oxides of manganese, iron, zinc, or lead, may also be added to any of the above materials. The ammonia or ammoniacal salts contained in the spent purifying materials may be removed by heat or washing.

The specification of the same patent contains an account of certain modes of treating the ammoniacal liquor of gas-works, so as to obtain from it and sulphate of lead, a solution of sulphate of ammonia, and either an oxide or carbonate of lead, of sufficient purity to serve as, or be converted into, white lead.

Mr. Laming converts the hydrosulphate of ammonia contained in gas-liquors into carbonate of ammonia by the following process:—A mixture of deutoxide of copper and charcoal, or other form of carbon in fine powder, in the proportion of twelve parts by weight of the former to one of the latter, is introduced into a retort made red hot and furnished with an eduction-pipe, which passes through cold water, and finally enters into the gas-liquor. The formation of carbonic acid gas soon takes

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place by the union of the carbon with the oxygen of the metal, and this gas combining with the base of the hydrosulphate of ammonia contained in the gas-liquor, converts it into carbonate, with liberation of hydrosulphuric acid. When the carbonic acid gas ceases to come away, nearly all the carbon will have disappeared from the retort, and the copper which it contains become reduced to the metallic state. The charge is then drawn and left to cool, while a second charge of similar materials is being worked off, during which time the copper re-absorbs oxygen from the air and becomes again deutoxide of copper, which may then be used anew with fresh carbon.

Mr. Hills, in his patent of Nov. 28, 1849, claims the use of the sub-sulphates, the oxychlorides, and the hydrated or precipitated oxides of iron (which he prefers to use in a rather damp state), either by themselves or mixed with sulphate of lime, or sulphate or muriate of magnesia, baryta, strontia, potash, or soda; and he causes them to be absorbed into or mixed with sawdust or peat charcoal in coarse powder, or breeze, or other porous or absorbent material, so as to make a very porous substance easily permeable by the gas. This material is to be put into a purifier (a dry lime purifier will answer the purpose) and the gas is to be passed through it; by this means the ammonia and other products are absorbed. By the admission of air and application of heat to the material so saturated with ammonia, this substance is driven off and collected by passing it through a condenser, or the ammonia may be fixed by an acid and converted directly into sulphate or muriate of ammonia. If sulphate of lime or sulphate of magnesia be present in the purifying material, these salts will be decomposed with the formation of sulphate of ammonia, which may then be washed out of the purifying material, concentrated by evaporation, and crystallized.

Mr. Laming, in his patent of April 23, 1850, claims the use of muriate of iron, of muriate of iron decomposed by lime into chloride of calcium and oxide of iron, of sulphate of iron decomposed by its equivalent quantity of chloride of sodium, adding to the solution of muriate of iron thus produced, enough hydrate of lime to decompose it into chloride of calcium and precipitated oxide of iron. In these, and in various modified forms of the same process, muriate of ammonia may be obtained from the purifying material when it has served its purpose, and has been removed from the purifying vessel. Mr. Laming also claims the use of a mixture of sulphate of lime and sulphate of iron, of a mixture of hydrated or precipitated oxide of iron with carbonate of lime, magnesia, carbonate of magnesia, or magnesian limestone, of chloride of magnesium or sulphate of magnesia and water, phosphate of lime dissolved in hydrochloric acid, and, lastly, of a mixture containing sulphate of magnesia or chloride of magnesium or calcium, or one or more of them in combination with oxide of copper, and mixed or not with lime or magnesia, or both or either, or both of the carbonates of those earths. In all these cases, the salts employed are mixed with sawdust or some other porous substance, and the material so compounded is placed in the purifying vessels of the gas-works. The gas in its passage through the purifiers gives up its ammonia, which is afterwards obtained as sulphate or muriate of ammonia, by washing the material when it has become fully saturated with ammonia.

Messrs. Crane and Jullien, in their patent of January 18, 1848, describe a method of manufacturing ammonia in the state of carbonate, hydrocyanate, or free ammonia, by passing any of the oxygen compounds of nitrogen, together with any compound of hydrogen and carbon, or any mixture of hydrogen with a compound of carbon or even free hydrogen, through a tube or pipe containing any catalytic or contact substance, as follows:—Oxides of nitrogen (such for instance as the gases liberated in the manufacture of oxalic acid), however procured, are to be mixed in such proportion with any compound of carbon and hydrogen, or such mixture of hydrogen and carbonic oxide or acid as results from the contact of the vapour of water with ignited carbonaceous matters, and the hydrogen compound or mixture containing hydrogen, may be in slight excess, so as to ensure the conversion of the whole of the nitrogen contained in the oxide so employed, into either ammonia or hydrocyanic acid, which may be known by the absence of the characteristic red fumes on allowing some of the gaseous matter to come in contact with atmospheric air. The catalytic or contact substance which Messrs. Crane and Jullien prefer, is platinum, which may be either in the state of sponge, or asbestos coated or covered with platinum. This catalytic substance is to be placed in a tube, and heated to about 600° Fahr., so as

to reduce the temperature of the product, and at the same time prevent the deposition of carbonate of ammonia, which passes onwards into a vessel of the description well known and employed for the purpose of condensing carbonate of ammonia. The condenser, for this purpose, must be furnished with a safety-pipe to allow of the escape of uncondensed matter, and made to dip into a solution of any substance capable of combining with hydrocyanic acid or ammonia where they would be condensed. A solution of salt of iron is preferable for this purpose.

Mr. Hills took out a patent, October 19, 1848, for improvements in treating certain salts and gases or vapours, in which he describes a method of distilling the volatile solution of ammonia for the purpose of producing ammonia of a more highly concentrated character. For this purpose he employs a tower, circular by preference, which should be about ten diameters in height; this is to be furnished with gratings, placed from three to four feet apart throughout the whole height of the tower; the spaces between each being filled with coke, pieces of earthenware, or other substances, to form greatly divided media. The volatile solution to be distilled, whether pure or combined with other matters, is to be introduced at the top of the tower, and allowed to percolate through the coke, while, at the same time, a jet of steam or heated air is introduced at the bottom, which, in its ascent, meets the ammonia distributed over a great amount of surface, by which means the more volatile parts of the ammonia become vaporized and carried off by the steam ; this being collected at the top and conveyed to a refrigerator and condensed, while the waste liquor escapes at the bottom of the tower. As an auxiliary to this apparatus, another tower is placed on the top of that already described. This the patentee calls a concentrator: it is filled with the same materials as the other, and furnished with a coil of pipe, through which the solution of ammonia is to be passed when introduced to the lower tower; the vapours arising from this partially vaporize the ammonia in the pipe, while, at the same time, the more aqueous parts of the vapours are condensed before passing off to the condenser.

Dr. Richardson's process, patented January 26, 1850, for manufacturing sulphate of ammonia, consists in subliming the double salt of sulphate of magnesia and ammonia obtained by the following method:—The ammoniacal liquor of the gas-works is added to a solution of sulphate of magnesia, with application of heat, until the solution is rendered nearly neutral ; the precipitate is then allowed to subside, and the clear liquor drawn off, concentrated by boiling to from 50 to 60° Twaddle (spec. grav. 1,250 to 1,300), and crystallized. If preferred, the gas-water may be neutralized by sulphuric acid before it is added to the solution of sulphate of magnesia. The double salt of sulphate of magnesia and ammonia may also be obtained, by subjecting the sulphate of magnesia, either in solution or in a damp state, to a current of ammoniacal gas, obtained by the distillation of gas-water, guano, or any other matter from which ammonia can be procured by destructive distillation with quick-lime ; the ammoniacal gas being purified before use by passing it through water.

Michiel's mode of obtaining sulphate of ammonia, patented April 30, 1850, is as follows :—The ammoniacal liquors of the gas works are combined with sulphate and oxide of lead, which is obtained and prepared in the following way :—Sulphuret of lead in its natural state is taken and reduced to small fragments by any convenient crushing apparatus. It is then submitted to a roasting process, in a suitably arranged reverberatory furnace of the following construction:—The furnace is formed of two shelves, or rather the bottom of the furnace and one shelf, and there is a communication from the lower to the upper. The galena or sulphuret of lead, previously ground, is then spread over the surface of the upper shelf, to a thickness of about 2 or $2\frac{1}{2}$ inches, and there it is submitted to the heat of the furnace. It remains thus for about two hours, at which time it is drawn off the upper shelf and spread over the lower shelf or bottom of the furnace, where it is exposed to a greater heat for a certain time, during which it is well stirred, for the purpose of exposing all the parts equally to the action of the heat, and at the same time the fusion of any portion of it is prevented. By this process the sulphuret of lead becomes converted, partly into sulphate and partly into oxide of lead. This product of sulphate and oxide of lead is to be crushed by any ordinary means, and reduced to about the same degree of fineness as coarse sand. It is now to be combined with the ammoniacal liquors, when sulphate of ammonia and sulphuret and carbonate of lead will be produced.

In order to obtain sulphate and muriate of ammonia with the greatest possible economy, Mr. Spence patented, November 12, 1850, the following process :—A series of two or more, say for instance four cylindrical boilers are placed at such a distance, one above the other, that the contents of the upper boiler may be drawn off into the one next below it. Each boiler is furnished with a cock, to allow of the passage of the contents of the boiler from one to the other throughout the series. Each of these vessels contains gas-liquor, from a reservoir of which a pipe passes to the upper boiler, which is also furnished with an exit-pipe. Into the lower boiler high-pressure steam is passed, which soon causes the gas-liquor to boil, and the vapour of ammonia and water passes off through an exit-pipe into the boiler placed next above it in the series, the liquor in which is thus also brought to boil, the vapour of ammonia and water passing off from it in the same way to the boiler next above it, and so on throughout the series. By the time the vapour of ammonia passes off from the uppermost boiler it has become so concentrated, that on passing it into sulphuric or muriatic acid, a concentrated solution of either of those salts is obtained, of sufficient specific gravity to crystallize without evaporation, and thus a considerable saving in fuel and time is effected, and the ammoniacal gas-liquor is most thoroughly exhausted. Fresh supplies of ammoniacal liquor are constantly furnished to the uppermost boiler from the reservoir ; whilst the partially exhausted liquors are run from the higher to the lower vessels in succession, and the exhausted liquors run off to waste from the lowermost vessel of the series. As the gas-liquors often contain some fixed ammoniacal salts, Mr. Spence recommends the addition of lime to the contents of the boilers, in order to render free the ammonia contained in such salts.

Mr. Wilson patented, December 7th, 1850, the following process of obtaining sulphate of ammonia from the waste products of coke-ovens and other furnaces. For this purpose he employs the following apparatus :—An iron column lined with lead, or a brick column lined with fire-bricks and well burnt clay, is filled with coke or round pebbles ; this column has an area or cross section five or six times that of the chimney connected with the coke-ovens, and is from twelve to fifteen feet in height ; at the bottom of this column, which can be supported on cross bars, is a space of three feet left clear, in which is placed a cistern, constructed of the same materials as the column, and another similar cistern is placed at the top of the column, its bottom being pierced full of holes. The lower cistern is then filled with sulphuric acid so diluted, that, when saturated with ammonia, it shall not form a solution of sufficient density to cause, on evaporation by the heat of the column, an incrustation of sulphate of ammonia. The gaseous products of combustion are then made to pass through the lower cistern up the column of coke, and as the acid liquor of the lower cistern is continually forced by suitable means into the upper perforated cistern, the ammonia in its passage upwards comes into contact with the acid trickling down through the column, and is thus prevented from passing off with the other products of combustion, which are conveyed by an exit-pipe into the chimney. When the acid liquor has become neutralized by the ammonia, it is drawn off, filtered, evaporated, and crystallized, a fresh supply of acid being placed in the lower cistern.

Mr. Laming patented, August 12th, 1852, the following method of manufacturing sulphate of ammonia from the ammoniacal liquors of gas-works. The ammonia is first separated in its simple form, or as carbonate of ammonia, by any known means, after which it is converted into sulphite of ammonia, by causing streams of sulphurous acid to be brought into contact with it, and the sulphite of ammonia is finally converted into sulphate by exposing it to the combined influences of atmospheric air and water.

Dr. Ure, in his *Dictionary of Arts and Manufactures*, states that 7200 gallons of ammoniacal gas-liquor treated with 4500 lbs. of sulphuric acid, sp. grav. 1625, produces 2400 gallons of solution of sulphate of ammonia, of sp. grav. 1150. As a gallon of solution of ordinary sulphate of ammonia, of the above strength, contains three pounds of crystallized sulphate, it follows that in the above case the product is at the rate of one pound per gallon of gas-liquor, which is almost double the quantity ordinarily obtained.

The quantity of ammoniacal liquor obtained at one of the London gas-works, during one year, from the distillation of 51,100 tons of coal, was 224,800 gallons.

Ammonia Meter.—In order to determine the strength of any given solution of

ammonia, Mr. J. J. Griffin, of Baker Street, has constructed a useful instrument, termed an ammonia meter. This instrument is founded on the following facts:—That mixtures of liquid ammonia with water possess a specific gravity, which is the mean of the specific gravities of their components; that in all solutions of ammonia, a quantity of anhydrous ammonia, weighing 212½ grains, which he calls a *test-atom*, displaces 300 grains of water, and reduces the specific gravity of the solution to the extent of .00125; and, finally, that the strongest solution of ammonia, which it is possible to prepare at the temperature of 62° Fahr., contains in an imperial gallon of solution one hundred test-atoms of ammonia.

The ammonia meter is accompanied by a table, containing six columns of numbers. The first column shows the *specific gravity* of the solutions; the second column the *weight* of an imperial gallon in pounds and ounces; the third column the *percentage* of ammonia by weight; the fourth column the *degree* of the solution, as indicated by the instrument, corresponding with the number of *test-atoms* of ammonia present in a gallon of the liquor; the fifth column shows the number of *grains* of ammonia contained in a gallon; and the sixth column the *atomic volume* of the solution, or that *measure* of it which contains one test-atom of ammonia. For instance, one gallon of liquid ammonia, sp. grav. 880 weighs 8lbs. 12.8 oz. avoirdupois, its percentage of ammonia, by weight, is 33.117, it contains 96 test atoms of ammonia in one gallon, and 20400.0 grains of ammonia in one gallon; and, lastly, 104.16 septems containing one test atom of ammonia. Although no hydrometer, however accurately constructed, is at all equal to the centigrade mode of chemical testing, yet the Ammonia Meter and the table accompanying it, will be found very useful to the manufacturer, enabling him not only to determine the actual strength of any given liquor, but the precise amount of dilution necessary to convert it into a liquor of any other desired strength, whilst the direct quotation of the number of grains of real ammonia contained in a gallon of solution of any specific gravity, will enable him to judge at a glance of the money-value of any given sample of ammonia.

WHAT IS COAL?

Much interest and excitement have been created among scientific men and others by the trial of a case "Gillespie *versus* Russel," which came before the Lord President and a jury in Edinburgh on Friday, the 29th of July, and occupied the court for six entire days. The question at issue related to the designation of a substance which, within the last few years, has been extensively used in the manufacture of gas. This substance has by some persons been considered to be a variety of coal, while others have denied the correctness of that designation, considering it to partake more of the characters of a shale or argillaceous bitumen than those of a true coal. The subject is highly interesting in a scientific point of view, and having elicited opinions in evidence from a very large number of eminent men as Chemists, Geologists, Mineralogists, Microscopists, and Engineers, we have been induced to allow it to occupy a larger space than we usually devote to matters of this kind.

Mrs. Elizabeth Honyman Gillespie, heiress of entail in possession of the lands of Torbanehill, in the parish of Bathgate and county of Linlithgow, and Mr. William Gillespie, her husband, were pursuers in the action; and James Russel and Son, coalmasters, Blackbraes, as a company, and James Russel, senior, writer in Falkirk, and James Russel, junior, residing at Arnotdale, near Falkirk, his son, the individual partners of said company, defenders.

The nature of the action will be understood from the following statement of the case:—

For the pursuers it is stated that, by missive of agreement for a lease, of dates March 20 and April 1, 1850, it was arranged that a lease should be granted by the pursuers to the defenders of "the whole coal, ironstone, iron-ore, limestone, and fire-clay (but not to comprehend copper, or any other minerals whatsoever, except those herein specified), in the lands of Torbanehill, lying in the parish of Bathgate and county of Linlithgow, and bounded as follows, viz., on the south by the river Almond, on the east by the county or parish road leading from East Whitburn to Bathgate, on the west by the county or parish road leading from West Whitburn to Armadale

toll-bar on the middle Glasgow road, and on the north by the lands of Alexander Weir, Esq., of Boghead, and others," for a period of twenty-five years from Candlemas 1850, at certain lordships for the first year, and £300 annually or the said lordships, according to the option of the proprietor, in each year thereafter. These lordships were on every 22½ cwt. of blackband ironstone, after being calcined and cleaned of dross, one shilling and sixpence; of clay-band and ball ironstone, one shilling; of raw clay-band and ball ironstone, sixpence; of coal separated from dross, sixpence; of coal-dross, one penny; of limestone in the raw state, sixpence; and of fireclay in the raw state, threepence. No more formal lease has been executed between the parties, but the defenders, about the term of Candlemas 1850, entered into, and have continued ever since in possession of the mineral fields in question; but instead of working and disposing of the minerals comprehended by the missive of agreement (though, in the course of their operations, they have come upon iron-ore and stone, coal and fireclay, of workable value), they have, without any authority from the pursuers, confined their operations chiefly or exclusively to the working and disposing of a valuable mineral substance of an argillaceous bituminous nature, which has not been let to them, and is not comprehended by the missive of agreement, and to which substance the defenders have no right or title whatever. The defenders have, prior to the date of this action, so put out the mineral in dispute to an extent of about nineteen thousand tons, calculated at 22½ cwt. per ton, and they have disposed of it under the erroneous or false name of gas coal. The substance so disposed of by the defenders is of much greater value than any of the minerals specified in the agreement of lease, and fetches in the market a price greatly higher than any description of coal. It is different from, and cannot be considered, classed, or dealt with as coal, or as any one of the other minerals to which the defenders are entitled under or by virtue of the missive of agreement. More particularly, it is, in its chemical and mineralogical constitution and qualities, different from coal, which the defenders pretend to say it is. And no such substance was, when the lease in question was entered into, commonly known or dealt with in the market or otherwise. In entering into the lease, the pursuers had not the mineral substance in question in view, and they did not intend or understand that any such substance was to be thereby let. The defenders, and some others following their example, or influenced by them, or misled by their representations, have, within about the last two years, been in the practice of designating the substance in question as coal; but in point of fact it was not, when said lease was entered into, known and dealt with, or treated as such, nor did it form an element of consideration in adjusting the terms of the same. The pursuers were altogether in ignorance at the time the lease or aforesaid agreement for a lease was entered into, that any such mineral substance was to be found in their lands, or had been found in Boghead or anywhere else.

The statement of facts for the defenders is to the following effect:—The lease engaged in by the defenders with the pursuers, formed a very advantageous transaction for the pursuers, who, or their predecessors, in the lands, had upon several occasions previously let, or attempted to let, their minerals to tenants, by whom successively the leases were abandoned, as not capable of being carried on by them to profit. The defenders engaged in the lease in the expectation of being able to discover, in the said lands, a particular description of coal which existed in the adjoining lands of Boghead, and which was supposed to run into the lands of the pursuers—the mineral strata of Torbanehill being understood to be the same as those of Boghead. This was a coal which contained a large quantity of inflammable matter, and was capable of being disposed of availably to gas-works. It was termed gas coal, cannel coal, or parrot coal—its more particular description in the locality, and in the market, being the *Boghead gas coal.* The defenders had for some time previously wrought this coal in the property of Boghead, as tenants of the minerals, and had been selling it to gas-works all over the country, under the name of the Boghead gas-coal; and, as before mentioned, they had the expectation of the same seam of coal running into the adjoining lands of Torbanehill. The pursuers, and those acting for them, were fully aware that the defenders were working this mineral in the lands of Boghead, and selling it under the name of Boghead gas coal, and that, in proposing to engage in the lease with the pursuers, they expected to find the same coal in the lands of Torbanehill. Moreover, in the month of January, 1850, whilst the negotiations for a lease were proceeding, the defenders transmitted to

the pursuer, Mr. Gillespie, a duplicate or certified copy of the lease which they held of the minerals in Boghead, under which they were at the time working and disposing of the mineral in question, under the name of the Boghead gas coal. In the course of the months of February and March, 1850, the parties were occupied in adjusting the draft of the missive of agreement for the minerals in Torbanehill. The pursuers, on their side, consulted and acted under the advice of Mr. John Geddes, mining engineer, Edinburgh, who was perfectly aware that the defenders were then working, in the adjoining lands of Boghead, the mineral in question, under the name of the Boghead gas coal. The missive of agreement was ultimately executed on the 30th of March and 1st April, 1850. By the adjusted missive of agreement, the defenders, as is usual in all mineral leases, were declared entitled to work the minerals for the first year, which is generally called the trial year, without any fixed rent being charged, but only a lordship upon what might be put out; and it was declared that, if during the said first year they should not find minerals which they considered they could work to profit, they should be entitled to abandon the lease upon giving six weeks' previous notice. During the said first or trial year of the lease, the defenders engaged in extensive operations for the purpose of proving the mineral field, and more particularly of attempting to discover the gas coal in question; and they did succeed during the trial year, but after several unsuccessful trials, in discovering a seam of the said coal in the pursuers' lands. Of their proceedings in this respect, the pursuers, and those acting for them, were kept fully informed. A correspondence took place between the defenders and the pursuer, Mr. Gillespie (who was still aided by the advice of Mr. Geddes, mining engineer), with the view, amongst other things, of reducing the fixed rent. In this correspondence, the defenders intimated to the pursuers the discovery of the mineral, the working of which is now sought to be stopped; and particularly, in a letter to the pursuer, Mr. Gillespie, dated 26th June, 1850, they wrote as follows:—"We have now pretty fully explored your mineral field, and, as far as we can see, the only seam we would be justified in trying to work for a profit, is the thin parrot coal (ten or twelve inches), which we are working at Boghead, and which we have also found in the pit at Torbanehill, although very troubled, and in different places of the mine we have run in, it altogether awanting." And being again requested by Mr. More, the pursuers' agent, to state the nature and extent of their operations, the defenders, on 19th August, 1850, wrote the pursuer, Mr. Gillespie, as follows:—"We also, at considerable expense, got the water out of the pit at Torbanehill, and having found the Boghill parrot coal on one side of the pit, four inches thick, but wanting on the other side, we started two mines on the coal, and got it for two or three yards of the full thickness a short distance in, but it again went off; and although we think it possible it may turn to a regular seam further on, this is by no means certain." And the defenders conclude this letter by saying—"We may state that, in our opinion, it is the only seam worth further exploring." The pursuers being thus fully informed of the discovery, by the defenders, of the coal in question, and informed that it was the only seam which the defenders considered workable to a profit, the pursuers, in a letter to the defenders of 5th November, 1850, referred in many places to the mineral under the name of gas coal, terming it in one place "our fine gas coal," and explained their sentiments with reference to the lordship proper to be charged thereon, if a modification of the fixed rent was made, or the terms of the original lease opened up for readjustment. In this and the whole communications passing between the parties, it was fully understood and assumed that the mineral in question was included amongst those let by the lease. The defenders having thus intimated the discovery, in the lands of Torbanehill, of the gas coal which they had expected to find, they, by letter of date December 18, 1850, intimated to the pursuers that they were to enter upon the lease, and to proceed with their workings under the lease. And in doing so, they again referred to the gas coal in question, as the mineral which it was their intention to work under the lease. They had also, prior to this, worked and laid down on the lands of Torbanehill about forty tons of the said gas coal, and the said coal lay there for about four months prior to the time of the above intimation. Except for the discovery of this coal, the defenders would not have proceeded with the lease, and it would have been unprofitable for them to have done so. The defenders proceeded under the lease to work the gas coal in question in these lands. They expended, upon sinking pits and other works, the sum of £3000 or thereby, and for a period of upwards of fourteen months posterior

to the trial year of the lease, they worked the said coal to the extent of upwards of 14,000 tons. During all this time, it was never once intimated to them that they were working what had not been let to them by the pursuers, although the pursuers knew of all their operations as they were proceeded with, having a check grieve inspecting the operations, and themselves residing on the property of Torbanehill. The mineral which the defenders wrought without objection, as mentioned in the last two articles, is that of the working of which the pursuers complain in the present summons. No other mineral worked by the defenders in the pursuers' lands, can in any sense be said to fall under that appellation. The defenders further maintain that the mineral in question is notoriously known, both in the neighbourhood and over the country generally, as a gas coal, and has, as such, been commonly dealt in, used, and trafficked in; and it is properly and essentially a coal, and possessed of the nature and properties of coal, merely containing a particularly large quantity of inflammable matter; and that it was both in reality and in the full knowledge and understanding of both parties, and particularly of the pursuers and those acting for them, comprehended amongst the minerals let to the defenders by the lease in question.

The following was the issue sent to the jury :—

"Whether the defenders are tenants of certain minerals in the lands of Torbanehill, belonging to the pursuers, under a missive of agreement, No. 44 of process? And

"Whether, in the course of the period between the term of Candlemas, 1850, and the month of May, 1852, the defenders wrought and put out from the said lands of Torbanehill a valuable mineral substance not let to them by the said missive, to the loss, injury, and damage, of the pursuers?"

Damages laid at £10,000.

The Dean of Faculty, Mr. Macfarlane, and Mr. Logan, appeared for the pursuers; and Mr. Neaves, Mr. Penney, and Mr. Young, for the defenders.

Mr. Macfarlane opened the case for the pursuers, briefly stating the nature of the lease, and giving a general outline of the evidence to be adduced in affirmation of the issues.

The first witness called was *Mr. D. T. Ansted*, consulting mineral engineer, and late Professor in King's College, London, who was examined by the Dean of Faculty. He said that he considered the mineral in question not to be a coal, and not to possess the essential elements of coal. It had not a sufficient quantity of carbon to give fuel after distillation, and its basis was not carbon but clay. It was valuable for the great quantity of gases it contained, but he was not aware that it possessed any other value, for when the gases were extracted from it, the virtue was gone out of it.

Professor Brande, Superintendent of the coining department of the Royal Mint, and at one time Professor of Chemistry in the Royal Institution, stated that he had examined a number of specimens of a mineral found at Torbanehill, which he had received from Mr. Rettie and Mr. Forbes. From Rettie's specimens he had got 30 per cent. of carbon and ash; this he denominated residuary or fixed carbon. Of volatile matter he had obtained 70 per cent. From another of Rettie's he had got 28 per cent. of carbon and ash, and of volatile matter 72. In Forbes's, he had got 33 carbon and ash in one case, and the remainder volatile matter; and in another 31 and 69. The average of the whole, which he had ascertained by taking a portion of each specimen, was 10 of carbon, 20 of ash, and 70 volatile matter. He had also subjected twenty-three specimens of Newcastle coal to the process of destructive distillation, and the average result was 77 carbon and 2 ash, and 21 volatile matter. The residue he found in the Torbanehill mineral was materially different in character from the residue in the case of coal. The carbonaceous residue of the Torbanehill mineral was a pulverulent sort of charcoal, while the other left ordinary coke. As regards the earthy residue of the Torbanehill mineral, it was distinguishable from the earthy residue of coal chiefly from its very large quantity, and by the absence, or almost entire absence, of salts of lime. It was also distinguishable in colour, the ash of coal being generally brown, from the large quantity of iron it contains, while this contains merely a trace of iron and is white. He afterwards instituted another series of experiments, along with Mr. Cooper, of London, for the purpose of comparing the Torbanehill mineral with the Leshmahago and the Marquis of Lothian's coals. In the case of the Leshmahago coal the result was 41 residuary carbon, 3 ash, and 56 volatile matter. The Marquis of Lothian's gave between 44 and 45 carbon, 2.4 ash, and 53 volatile matter. The Torbanehill mineral gave 55 carbon, 5 ash,

and 40 volatile matter. There was no difference beween the experiments he had made in conjunction with Mr. Cooper and those which he had formerly made. They had also subjected the Torbanehill mineral and the coal to the process of digestion in naphtha. With the coal they obtained a brown tincture; with the mineral the naphtha remained pure in colour. In the case of coal the watery products were alkaline from the beginning; in regard to the mineral, they were slightly acid in the first instance. The cause of the alkaline character of these watery products in the coal is the formation of ammonia in consequence of the presence of hydrogen and nitrogen. In the other case, there was a slight formation of acid, which he believed to be acetic acid, and which is formed during the process of distillation by the union of carbon, hydrogen, and oxygen. In the latter case there was no nitrogen. The gases produced by the Torbanehill mineral were principally varieties of carburetted hydrogen, which is also produced by the distillation of coal. As the result of all these chemical experiments, he considered that the Torbanehill mineral was certainly not coal, and as a chemist he clearly pronounced it not to be coal.

Cross-examined by Mr. Neaves.—The Newcastle coal was indiscriminately used for household coal and for gas. In this case, the fixed carbon, according to the statement he had already made, was 10 out of a total of 100. He could not tell the *total* amount of carbon in the Torbanehill mineral out of 100 parts, as he had not made what is called an ultimate analysis of it. But he knew that there were other chemists that had made it. There was certainly more carbon than 10 per cent. Of the 70 of volatile matter, a considerable proportion must have been carbon. There was a small quantity of fixed carbon as compared with the acknowledged coals which he had examined. He considered that the small quantity of fixed carbon necessarily implied a small quantity of total carbon. It might, however, arise from there being a greater proportion of hydrogen in the mineral. After all the hydrogen had combined with the carbon and become exhausted, the unexhausted carbon remained as fixed carbon. The more carbon went off the less remained; and the more gas the less fixed carbon. In the other experiments referred to there was a very minute quantity of colouring matter taken up from the coal which did not exist in the Torbanehill mineral. He presumed it to be bitumen.

Q. Do I understand, then, that naphtha, when brought into contact with bitumen, takes up a portion of that bitumen?—*A.* Yes.

Q. In solution?—*A.* Yes.

Q. Then I understand that from the common coal there was bitumen to be dissolved in the naphtha, and that in the Torbanehill mineral there was no bitumen?—*A.* I would rather adhere to my original statement, that in the one case there is a colouring tincture, in the other less.

Q. Suppose your supposition is right that it is bitumen, would you infer that there is bitumen in the coal, and none in the Torbanehill mineral?—*A.* Yes, I should say that there was a trace of ready-formed bitumen in the coal, which did not exist in the Torbanehill mineral.

Q. Now, Mr. Brande, you say that you do not consider this is a coal; what do you consider that it is?—*A.* A peculiar mineral.

Q. Anonymous?—*A.* Well, I never saw a specimen of it before, and, therefore, I cannot—being no mineralogist—pretend to say.

Q. It is, then, a peculiar mineral, to which you cannot give a name?—*A.* No.

Q. The other ingredients of coal also vary in different coals?—*A.* Yes.

Q. Are they very various?—*A.* Yes.

Mr. Anderson, Professor of Chemistry in the University of Glasgow, examined by the Dean, said,—He had examined the Torbanehill mineral, both as to its mineralogical and chemical character; is a black carbonaceous mineral, with a resinous or waxy lustre, a black and lustrous streak, and a conchoidal fracture. This applies to bituminous coal only. Bituminous coal, however, is only one division of coal, which is divided into anthracite, bituminous coal, which are the true coals; and brown coals, which are a third and altogether distinct variety, called also lignite. Anthracite is hard and black, with an exceedingly brilliant lustre, and consists principally of carbon, and the quantity of carbon in it is very great, and is almost entirely fixed. Lignite is exactly like a piece of charred wood, like a piece of imperfectly-made brown charcoal, with carbon much smaller than in anthracite, but still considerable. Lignite is clearly a vegetable formation; hence

its name. It is found in the tertiary formation, not in the coal-measures. Bituminous coal is divided into cherry coals, splint coals, caking coals, and gas coal or cannel. Mineralogically speaking, cannel coal is black, sometimes with a greyish or brownish shade in it; its streak is black and lustrous; and its fracture, described mineralogically, is large conchoidal; its lustre is resinous or waxy, and it polishes. With regard to the mineralogical character of the Torbane mineral, its colour is brown; its streak is pale fawn-colour, and perfectly dull, with no appearance of lustre. Its fracture is somewhat slaty, that is, parallel to the stratification, and not conchoidal. It does not polish at all. In arriving at the results he had now stated, he had examined the West Wemyss and the Cappledrae cannels, which come nearest in their mineralogical character to the Torbane mineral. There are important differences between them and the Torbanehill. The Wemyss cannel is black, with a resinous lustre; the streak is black and lustrous, and the fracture is conchoidal. He had also examined a mineral which is found at Methill, in Fifeshire, specimens of which approximate in some respects to the brown colour of the Torbanehill mineral. Its streak has a somewhat brownish shade, but it is lustrous, as regards individual specimens; but if he was to state the general appearance of the coal, it gave a black streak. He had also examined the Torbanehill mineral with reference to its chemical qualities and composition. An ordinary average specimen, taken from the central part of the seam of Torbanehill, contains 64.02 per cent. of carbon, 8.9 per cent. of hydrogen, 0.55 per cent. of nitrogen, 0.5 of sulphur, 5.66 of oxygen, and 20.32 of ash. The main ingredients were the carbon and the ash; but the hydrogen was important also. In the upper part of the seam the ash is very much higher, there being 32.3, nearly a third part of the whole mineral. In the lower part of the seam he found it to be 38.54. The ash found, on the average, was 30.38 per cent. of the whole mineral. The average of the carbon of these different parts was about 60 per cent. It varies considerably, but it is not above 60 per cent.

Cross-examined by Mr. Penney.—Anthracite was not strictly, in mineralogical language, a coal, but was so in common language. Lignite was also commonly called coal, but not rightly so. It was a distinct species, and not a true coal. The amount of ash in coals differed very considerably. The ash never exceeded a third of the coke. When the amount of the volatile matter thrown off was great, that made the coke less. Bituminous shale was not a coal. Shale was a clay impregnated with a coaly or bituminous matter which might be extracted from it as from bituminous coals. The component parts of the shale were the same as coal. The chief difference was in its structure as to splitting. Its split was parallel to the stratification. Most coals split with a cross fracture. Shale had no cross fracture. A large percentage of ash was a distinction between coal and shale. The Torbane mineral was not a shale. He could not give it a name.

Re-examined by the Dean of Faculty.—He could not give it a name, because it was a new mineral, and had not received one. The nomenclature of mineralogy was receiving additions every year. The chief distinctions of shale from coal was that the specific gravity was different. Shale presented an amorphous appearance under a microscope, and betrayed no symptom of organic structure, and had a clayey and not a carbonaceous base. While in ordinary coals the ash never exceeded a third of the coke, in this mineral the rule was reversed, and the carbon was under one-third.

Mr. David Milne Home, of Milnegraden, who was next examined, generally corroborated the evidence of Professor Anstead as to the different ingredients to be found in coal and the Torbanehill mineral. The witness only spoke to the geological bearing of the question at issue, and during his examination expressed his conviction that the disputed mineral was a bituminous clay, and not coal.

Edward John Chapman, Professor of Mineralogy, Toronto, Canada, and late of the University of London, deponed that he had had specimens of the Torbanehill mineral for experimenting upon, and he could find no organic structure in it. The mineral was clay impregnated with inflammable matter or bituminous shale, and from it he could obtain nothing like coke. The cannel coal exhibited traces of organic structure, and therein differed from the Torbanehill mineral, which could not be called coal.

Mr. Hugh Miller, the author of the "Old Red Sandstone," was next examined. All true coal he considered was of vegetable origin. He found the Torbane mineral

to differ from all coals he was acquainted with, in the circumstance that it had not a fixed carbonaceous base, and had what all true coals wanted, a base of earth, which remained in the same bulk and form after the consumable parts were burned out, as shales did. He did not regard the mineral as a coal; it was the most inflammable shale he ever saw. Being asked by Mr. Neaves, in cross-examination, to mention any substances popularly called coal, which were not coal, Mr. Miller said that, by his concordance, there were twenty-four or twenty-five different places where the word coal occurred in Scripture, but there was only one place—the 120th Psalm, where it was shown that the coal referred to was not what he meant by coal,—"What shall he give unto them?" &c. "Sharp arrows of the mighty, with coals of juniper," from which he inferred that the coals meant wood. Being questioned whether he supposed this laxity was not confined to the Scriptures, he said that being there, it was natural, considering how much of our language was derived from Scripture, that it should be very extensive elsewhere. In re-examination, he said he believed that what was designated as coal in Scripture, meant simply a piece of wood, or, perhaps, charcoal.

Mr. Alexander Rose, Lecturer on Mineralogy, and Consulting Mineralogist, was well acquainted with Scotch cannels, and with Scotch coals in general. He considered the Torbane mineral different from all these in character. As a mineralogist, he would consider it as a bituminous clay. It was lower in specific gravity than coal, and was lower in the scale of hardness. It was less brittle than coal, and its streak was brown instead of black. It was slightly translucent, while coal was opaque.

The Rev. Dr. Anderson, Newburgh, had paid considerable attention to geology and mineralogy, and was at present engaged on a work on the geology of Scotland. He had descended the Torbanehill pits, and had carefully examined specimens of the mineral. He was of opinion that it possessed no property in common with coal, except that gas might be produced from it.

Dr. George Wilson, Lecturer on Chemistry, Edinburgh, considered the Torbane mineral a clay, largely impregnated with bitumen, and did not regard it as a coal. He had made chemical analyses, along with Professor Miller, of King's College, London, of thirteen Scotch cannels, and was examined upon them. The principal characteristic of the Torbane mineral he considered to be, that it left no available coke. He thought that no substance could be called coal unless it gave a considerable residuum of coke. In cross-examination he stated that some substances which went to compose coal might be found in the Torbane mineral, though in different degrees and arrangements. Coal was a mixture of different compounds, and, with the exception of anthracite, was not a homogeneous mass.

Professor Queckett, Professor of Histology in the Royal College of Surgeons, London; *Dr. James Adams*, Glasgow; and *Mr. Bowerbank*, Microscopist, London, were examined as to the appearance of the mineral under the microscope, and gave their opinion that it was different in organic structure from coal, and presented no traces of vegetable origin.

Mr. J. T. Cooper, Consulting Analytical Chemist, London, was examined upon the chemistry of the question, and also gave his opinion that the mineral was not coal.

Adam Harper, *John Lumsden*, and *James Dunsmure*, Miners, who had worked in the Torbane pit and in coal-mines, stated that the mineral, when struck, produced a deaf, and not a clear sound like coal; that it emitted a smell of gas sometimes so strong as to produce headaches, or make them vomit, which they had never experienced while working in coal, and that it is very difficult to work compared with coal.

Mr. James Anderson, Coal-manager to Sir John Maxwell; *Mr. William Edwards*, engaged in sinking pits at Bathgate; and *Dr. James Robertson*, Coal-manager, near Renfrew, gave their opinion, as practical men, that the mineral was not coal.

Dr. John Lee, Consulting Chemist to the Corporation of Manchester, stated that the mineral yielded gas of a highly illuminating power, and of large quantity,—14,000 cubic feet of gas per ton; while the best cannel he knew,—the Wigan cannel,—only produced 11,500. The mineral yielded much more tar than any coal he knew, but much less ammonia. He did not consider the mineral as coal, but supposed it had been so called from also producing gas.

Mr. William Walker, Manager of the Kilmarnock Gas Works, spoke to using the

Torbane mineral for gas, and to the high quality and larger quantity of gas it produced than coal.

Mr. Robson, Mining Engineer, Newcastle, manager of extensive coal-fields, was then examined as to the appearance the Torbane mineral presented to him as a practical man. He stated that if he found this mineral in boring he would pronounce it not to be a coal, but a bituminous shale. He described its characteristics, and said they were not those of any coal he was acquainted with. There was nothing peculiar, however, in the stratification of the Torbane field, and similar strata might be seen in coal-fields.

Mr. Robertson, Accountant, Edinburgh, factor to Mr. Durham, of Boghead, spoke to a lease at present in negotiation for the Fowlshiels mineral fields, contiguous to Boghead, where the same mineral was found as at Torbane. The lessees, the Messrs. Hardie, one of whom was a son-in-law of Mr. Russel, the defender, had agreed, should the lease be accepted, to pay 1*s.* 6*d.* per ton lordship for the argillo-bitumen, or mineral similar to that wrought by Messrs. Russel; 1*s.* 3*d.* per ton for ordinary cannel coal; and 1*s.* per ton for inferior cannel coal.

Mr. Thomas Miller, Colourman to Her Majesty, Long-Acre, London, stated that he had tried the Torbane mineral as a base to strike colours upon. It was a most difficult thing to get a good base, and he had been in search of one for forty years. This mineral he found to possess extraordinary qualities, and to be the most perfect base he had yet obtained. He formed the base from the ash, which he purified to whiteness, and then struck the colours upon it. No kind of coal or cannel would suit the purpose, from their leaving coke or a carbonaceous residue instead of ash. Colours, when struck upon a good base were unchangeable, and would be as good a thousand years hence as now.

This closed the evidence for the prosecution.

The defenders' case was opened by

Mr. Penney, who said that the question which the pursuers had presented to them was, whether in the opinion of witnesses, more or less competent to judge, the mineral in dispute was coal, or was not coal. The question which he was to ask them was a simple one, namely, Whether or not the mineral was that let by the pursuers to the defenders or no? The pursuers had mainly presented to the jury a question of science; he intended mainly to present it to them as a question of contract between man and man. He did not say that the scientific question was an unimportant one, and he was prepared to meet the pursuers' evidence by testimony second to none which had been brought forward; but the question on which he mainly rested was, whether this mineral was not let by this missive to the defenders? He expected the witnesses for the defence would show that the mineral was truly and generically a coal, and that the distinctions which had been attempted to be drawn by the persons were altogether of the most trifling and unessential kind. They could show that gas coals differed in variety, characteristics, uses, and value; and that this was one of the varieties of it. Their next inquiry would be how this coal was dealt with, and trafficked in; and they could prove that this coal was commonly known and trafficked in as gas coal all over the neighbourhood and the country generally; that it was this very coal which was intended to be leased and let when the contract was entered into, and that the mineral then known as Boghead coal was known to the parties, and expected to be found in Torbanehill field when the missive was executed. The learned counsel continued at some length to describe the nature of the defenders' case, and the evidence which could be offered in support of it.

Professor Fleming, New College, Edinburgh, was the first witness called. After defining coal, not as a chemical substance, but rather as a mixture of heterogeneous substances, he stated that he was acquainted with a great variety of cannel or parrot coals. The term "cannel" he derived from the Lancashire pronunciation of candle, these coals burning like a candle; while the "parrot" he conjectured, might be applied to them from the fact that, when burning, they "chattered" somewhat like a parrot. He proceeded to say that he had visited the Torbanehill mines, and that he considered the mineral found there to be the very same as, and in no essential respect different from, parrot coal. Some portions of it might be broader in the streak, but that he regarded as a matter of no consequence. He had discovered considerable traces of vegetable structure, both in the floor and roof of the pit; and

he had also found the remains of three different varieties of plants commonly known in the coal measures. As a mineralogist, he asserted that the mineral did not appear to him to differ from the substance called coal; it agreed entirely in structure and combustibility with "cannel" coal; its fracture was also the same. He had seen the Methyl coal, which resembled the Torbanehill mineral very closely. In cross-examination by the Dean of Faculty, Professor Fleming further stated, that he had burned the Torbanehill coal, and that the ash or residuum was the same in quantity as that remaining from other coals; it burned with the peculiar large flame and smoke of cannel coal, and "chattered" in burning.

Professor Graham was next examined. He stated that he was Professor of Chemistry in the University College, London, Corresponding Member of the French Institute, and Chemist to the Royal Mint. He had examined specimens of the Torbanehill mineral; the ash in each of these was 19, 20, 22, 22, 28, and 30 per cent. respectively. This ash did not bear a fixed proportion to the specific gravity of the mineral, one specimen which gave 22 per cent. of ash having a specific gravity of 1.28, and the specimen with 30 per cent. of ash having a specific gravity of 1.22. From this he inferred that the combustible part of the coal was variable in composition; the density seeming to be more affected by the combustible material than by the ash. He concluded also that the substance was not homogeneous. In different coals there was a great difference in the amount of ash; that ingredient varying from under a half per cent. to very nearly fifty per cent. Professor Graham then described several experiments which he had made on the Torbane coal with reference to its coking quality, stating that when subjected to cherry-red heat for an hour, it gave 41.8 per cent., and for five hours 37.9 per cent. of true coke. The first coke contained 47, and the second 41.9 of combustible matter; when turned red-hot into the air, it burned like charcoal, although evidently an inferior fuel. The ash resembled that of other coals. On reducing the mineral to powder he found that it contained the merest trace of bitumen, agreeing in this respect with the acknowledged bituminous coals. The other ingredients were also such as were found in these coals. He therefore pronounced the mineral decidedly to be a coal.

Mr. John Stenhouse, F.R.S., Lecturer on Chemistry in Guy's Hospital, said he considered that the substance in question contained a great deal of coally matter; it was not more marked with bitumen than any other coal. His opinion was that it was undoubtedly a coal, very similar to the ordinary parrot coals, and he had only been astonished how any question should ever have been made about it.

Professor Johnston deponed that he was Professor of Chemistry and Mineralogy in the University of Durham, some time Lecturer on Chemistry to the Highland Society, and Fellow of the Royal Societies of London and Edinburgh. He had devoted a great deal of attention to chemistry, geology, and mineralogy, had published various works on the two former subjects, and had visited a good many coal fields both in this country and abroad. He had recently examined the Torbanehill coal field, and found the usual stratification of coal measures. The beds above and below the mineral in question were those usually found in the coal measures. He also observed traces of vegetable remains; and the origin of the mineral he regarded as being the same as that of other coals—decomposed vegetable matter. From its geological appearance, then, he had no doubt of its being a coal. Its colour was peculiar; some portions of it were lighter in the streak than other varieties of cannel coal, while other parts were darker and resembled the Methel and other coals from Fifeshire. There was, however, a mineral called coal which was still lighter than this mineral; he referred to the "paper coal" from the banks of the Rhine. Cannel coals were generally lighter than other coals, but some of them were quite as dark. In this case some parts were lighter and some darker; still he came to the conclusion that it was coal. He had made an analysis of it, and found 21.3 of ash in the black and 24.3 in the brown specimens. The quantity of ash differed considerably in different coals; the best Durham containing only one-half per cent., while he knew, from his own examination, that at New Brunswick there was a description of coal which contained 49 per cent., and another on the Missouri which contained from 30 to 33 per cent. The other ingredients of coal also differed considerably. On the whole, he had satisfied himself from the general appearance of the mineral in question that it was a coal; nothing in his experiments had led him to doubt it, but on the contrary everything had tended to confirm his opinion.

Professor A. Ramsay, F.R.S., and F.G.S., Professor of Geology in the Government

School of Mines, *Mr. Joseph Jukes; Mr. Pease*, mining engineer; and Mr. *Charles Maclaren*, were next examined. Mr. Maclaren stated that he had gone down one of the pits at Torbanehill, and found the mineral occurring in the regular coal measures. It had all the essential characters of coal, and he had not the least doubt that it was coal. The evidence of the other witnesses was to the same effect.

Professor Hofmann, Professor of Chemistry in the Government School of Mines, stated that he was a pupil of Professor Liebig's, and acted for some time as his assistant. He had made some experiments on the Torbanehill mineral, and found its component parts similar to those which composed coal. Its ash contained the same ingredients, and its combustion agreed in character. He had subjected it to the usual solvents and tests for ascertaining if it was a mixture of bituminous matter, but he only discovered the merest trace of bitumen, and it was not reduced to a fluid state as would have been the case if it was bitumen. Looking at the composition and character of the mineral as a scientific Chemist, he considered it an undoubted coal. The ingredients of coal varied considerably, but carbon was the largest ingredient, and from 100 he extracted 65.66 parts of this substance. He also found that it contained about 20 per cent. of earthy matter, which remained after the combustion of the carbon. There was nearly 9 per cent. of hydrogen; and this he, as a scientific man, did not consider as being incompatible with this mineral being a coal. He did not believe there was a bitumen in this body, but it might have produced it. He found no benzol in the body itself, but he found it in the products of the distillation of the mineral—another feature in which it bore a strong resemblance to coal. Coal shales generally contained 60 per cent. of earthy matter; but looking at the proportion of earthy matter here, as compared with the carbonaceous matter, this mineral could not be called a shale or schist, its predominant constituent not being earthy matter, as in shale or schist, but carbonaceous. He considered it, in short, to be a true coal.

The Professor was subjected to a rigorous cross-examination by the Dean of Faculty, without, however, eliciting much further information on the subject. On being asked if he was sure he had got benzol from the mineral, he exclaimed, "Yes, I have got it in my pocket"—(laughter)—producing a phial filled with the substance. "Let us see it, Professor; how shall we know it?" asked the Dean. "Oh, I have provided for that too," he answered, "and I could make it visible to the Court." (Laughter). This, however, was dispensed with, and the witness left the box, reiterating his conviction that this mineral was coal, and nothing else than coal.

The next witness examined was *Dr. A. Fyfe*, Professor of Chemistry in King's College, Aberdeen, who stated that, during the last twenty years,—ever since gas came into use in this country,—he had analyzed all the cannel coals in Scotland, with a view to ascertain their gas-producing qualities. He had also examined specimens of the disputed mineral, and, in his opinion, it in no respect differed from the ordinary cannel coals, except its being of a very superior quality. Comparing its constituents with the Capeldrae cannel coal, he found them to be as follows:—

TORBANEHILL MINERAL.		CAPELDRAE.	
Carbon	60.25	Carbon	56.7
Hydrogen	8.8	Hydrogen	6.8
Oxygen	3.6	Oxygen	8.8
Nitrogen	1.5	Nitrogen	1.9
Sulphur	.3	Sulphur	.25
Ash	25.6	Ash	25.4

The only difference between the two was, that the Torbanehill was a better gas coal than the other. He had subjected Lesmahagow and parrot coal to the same process as had been patented by Mr. Young, of Bathgate, for the extraction of oils from the mineral, and he had obtained the very same products. He therefore considered it only a coal.

Dr. Douglas Maclagan, Lecturer on Materia Medica, Edinburgh, had examined the Torbane mineral and several cannels for the purpose of comparison. It burnt exactly like a cannel coal; its products, when heated in a retort, were also the products of cannel; and exposing it to the action of naphtha, which made substances containing bitumen yield to it, he found only an infinitesimal quantity—mere traces of it. From all the results of an analytical and comparative examination, he came to the conclusion that the mineral was cannel coal. Shale was a mineral with a

larger quantity of earthy matter than coal; but, so far as he knew, there was no line of demarcation between coal and shale. They run into each other. If the clayey matter predominated, he should call it a shale; if the carbonaceous matter preponderated, he would call it a coal. He analyzed the ash of the Torbane mineral, and he found it to contain the same constituents as the ash of the cannels.

Dr. Gregory, Professor of Chemistry in the University of Edinburgh, had subjected specimens of the Torbane mineral to a chemical analysis. He made a fair inquiry and investigation to enable him to come to a decision as to its properties and composition. The conclusion to which he came was that the mineral was a cannel coal of a certain class. There were varieties in the composition of cannel coals, and he considered this mineral as belonging to one division of these coals. He considered it as a coal with a very considerable tendency to slaty structure. In no essential particular did it vary from the general character of coal. Portions of the mineral varied a little, but within the limits of variance he would consider it to be a coal.

Cross-examined by the Dean of Faculty.—The material difference between bituminous shale and coal, was in the frequent occurrence of the conchoidal fracture, and the large proportion of combustible matter. In bituminous shale the amount of combustible matter was much less, and its slaty structure was decided and invariable. In coals the structure was less slaty, even in slaty coals.

Re-examined by *Mr. Neaves.*—The earthy matter in the specimens of the mineral he examined was twenty-five to thirty-one per cent. This was an extreme which was incompatible with its being a shale. A shale would contain a much larger quantity—a preponderating quantity of earthy matter.

Mr. Edward Frankland, Professor of Chemistry, Owen's College, Manchester, regarded the Torbane mineral as a true coal, and similar to other gas-producing coals. It would not be properly described by the name of shale, because of its small percentage of ash and its large percentage of combustible matter. Carbonaceous matter was certainly the base of the mineral, and not clay. He discovered no bitumen in it. Its gas-producing powers were much greater than those of bituminous coals.

Mr. Dickenson, Government Inspector of Coal-mines in England, considered the Torbane mineral as a parrot coal. It seemed to him, however, to be the best cannel he had yet seen.

Mr. Thomas Foster, mining-engineer, Newcastle, said that if he had been exploring a mineral field, and produced this mineral, he would have entered it as a gas or parrot coal.

Thomas Richardson, mining-engineer, Newcastle, had studied under Liebig. From a comparison of the analyses of the ash of this substance with that of cannels, he was clearly of the opinion that the mineral belonged to the same class of coals as the Methel and other cannels.

David Landale, mining-engineer, Edinburgh, was well acquainted with the Fife coal-works, having been for fifteen years manager of a coal-work there. There was a great variety in the character of gas coals in Scotland; but, in his opinion, the appearance and qualities of this mineral were not so dissimilar to those ordinarily met with as to take it out of the category of coals.

Niel Robson, C.E., Glasgow, who has been in practice as a mining-engineer for twenty years, said he had found it among the ordinary coal strata, and from the appearance of the stuff itself, he had come to the conclusion that it could be nothing else but parrot coal.

James Ferguson, lessee of the coal-works at Lesmahagow; *John Mackenzie*, manager of the Dundyvan works; *Mr. Meiklam*, manager of Messrs. Dunlop's Clyde iron-works; *James Hunter*, managing partner, Coltness iron-works; *Alexander Whitelaw*, manager of the works at Gartsherrie, of Messrs. Baird; *Thomas Nimmo*, coalmaster at Cleugh and Haywood, Carnwath; *W. Alexander*, mining-engineer, Glasgow; and *D. Kerr*, manager of the Wemyss collieries in Fife, all gave evidence to the same effect, declaring their undoubted conviction that the mineral was nothing but coal.

Professor *Balfour*, University of Edinburgh, *Dr. Greville*, Glasgow, and Professor *Harkness*, Queen's College, Cork, were examined upon the structure of the mineral as exhibited by the microscope and as compared with cannels. Their opinion was that the mineral was coal. Its structure was vegetable—the structure characteristic of the fossil plants of the coal formation. There were three structures in coal—the

woody fibre, the scalariform, and the cellular tissue—all of which were found in the Boghead mineral. Shales did not exhibit any traces of vegetable structure.

Dr. William Aitken, Glasgow, proved that the microscopic sections produced were made by himself and Dr. Greville, from fair specimens of the different minerals.

Mr. John Williamson, mining-engineer, Edinburgh, was lessee, in 1847, of the Boghead coalfield; but came upon a seam so partial and irregular, that he found he could not work it to profit, and he gave it up, though what he produced was a good gas coal. The mineral was the same as was now known as the Boghead gas coal. It had been so named all along, and was so known in the market before the defenders leased Torbanehill.

Mr. George Foster, mineral borer, Bathgate, had come upon this mineral in boring so early as 1837; and, from the first, the name it commonly got in the district was parrot coal.

Professor Penny, of the Andersonian University, Glasgow, some years ago made an analysis of what was called the Torbanehill mineral. He at that time considered it to be a valuable gas coal; and, from the specimens which he afterwards saw of the mineral, he had no doubt of the correctness of his opinion. The proportions of ash varied in different coals. He had made an analysis of several which he knew. In Capeldrae, the proportion was 31.5 per cent.; in Methill, it was 29.7; in Stevenson, 19.35; in Hillhead, 27.4; in Bartonshill, 38.7; in Bathvale, 29.2; and in the Torbanehill, 21 per cent. The quantity of ash in the variety made it more or less valuable as a coal, but still it remained a coal.

Certain papers were then given in on the part of the defenders, which closed their case.

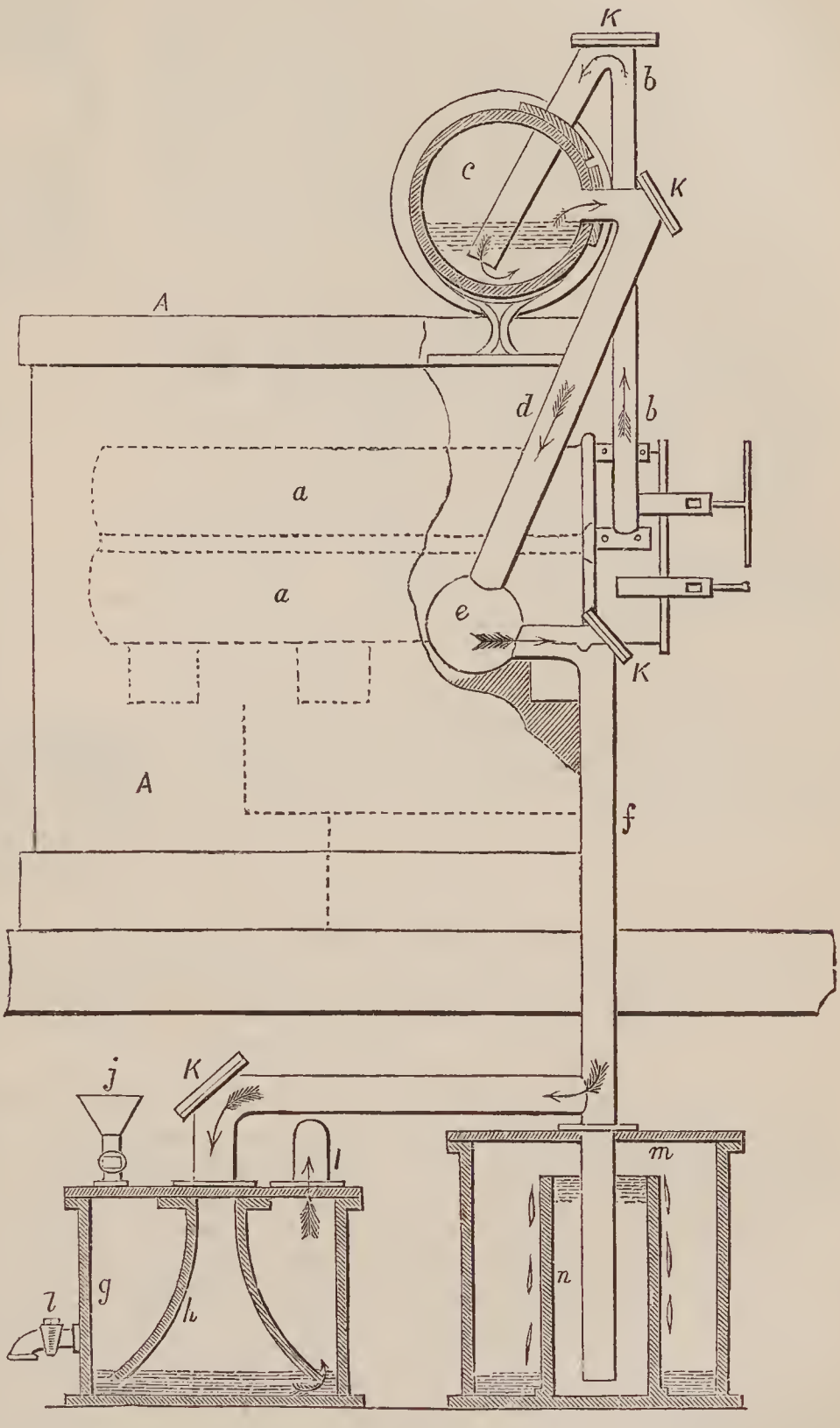
The *Lord President*, in summing up the evidence, directed the jury that the question they had to consider was, whether the mineral the defenders were working was a coal, according to the construction put on the word in the lease. Did it or did it not fall within the description "the whole coal, ironstone, iron ore, limestone," &c., that were included in the lease? This brought them to the inquiry—Was it coal, or was it not coal? in the sense in which it was spoken of in the language of the lease; for to ask whether it was coal or not coal, in the language of geologists, might come to be a rather difficult question. One set of gentlemen said positively that it was not a coal, and another set just as positively averred that it was. He believed they all spoke their opinions as geologists with perfect sincerity, and according to the classification which they, themselves, had attached to coal; for he was not aware, in the course of the evidence, that any of the witnesses had ever appealed to any definite standard to which all geologists might appeal. When they went to the chemists, the matter did not get much clearer, for though men, the most eminent in the country, were examined on both sides, they could not agree in their estimate of this mineral in dispute. Five chemists who applied the test, declared that it was not coal, and ten chemists, no way inferior to them in ability, who had also applied the test, said they had formed the decided opinion that it was a coal. Besides these witnesses, there had been examined another class of scientific gentlemen, the microscopists, three for the pursuers and four for the defenders, the former of whom asserted that there was no organic structure in the mass of coal, and the latter as firmly asserting that there was. He did not think that this sort of balanced evidence would help them much in the consideration of the case. On the scientific part of the question, it was for the jury to say whether there was such a difference in the structure of this mineral from other cannel coals as to enable them to say that it was not a coal. In respect to the imputation of motives on either side, he could see nothing of this in the correspondence, as both parties seem to have acted fairly, and in the way they thought best for their own interest. His lordship then briefly presented an abstract of the evidence that had been led, commenting on it as he went along, and concluded by leaving the case in the hands of the jury.

The jury then retired, and were not more than ten minutes absent, when they returned into Court, and, through their Chancellor, intimated that they found generally for the defenders.

There was a suppressed buzz of approbation heard when the verdict was announced.

ON THE MANUFACTURE OF GAS FROM WOOD OR TURF.

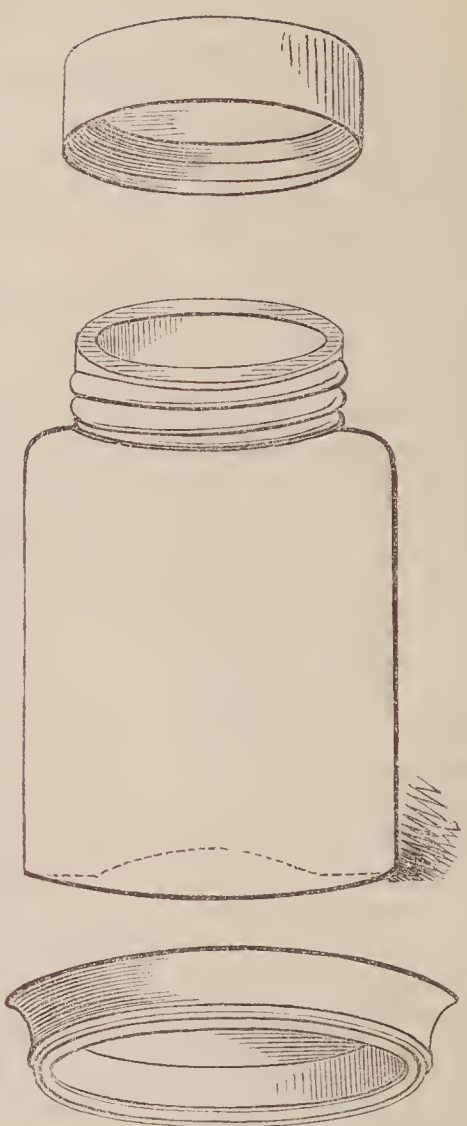
(Communicated by Mr. John Ayliffe, junior, Moscow.)



The annexed figure is a side-view of a retort-bed for three retorts, with its appurtenances, for making illuminating gas from wood or turf; which I consider to be worthy of notice, as it may be of great service in countries where wood or turf is cheap, and lime and coals difficult to be got. It has the great advantage, moreover, of not requiring purification. According to many experiments which I have made in Moscow, I find that the gas from wood is a great deal cheaper than that from coals; that it is not so injurious to health; that the retorts may be worked much longer; and that six times the quantity of gas can be made in the same time, with the same number of retorts. The following is the explanation of the figure:—

A A is a retort-bed, with three retorts, *a*, *a*, *a*, into which the wood is placed to be carbonized. *b* is the ascending and dip-pipe, by which the gas is conveyed into the hydraulic main, *c*. *d* is a pipe through which the gas is made to pass into the ball, *e*, which is fixed in the bed, and heated to a dark-red heat. The gas passes from this ball into the naphtha-cistern, *g*, in the basement of the works, through the pipe, *f*, which conveys the liquid passing over with the gas into the cup, *n*. The cup, *n*, stands in the box, *m*, which acts as collecting-box for all refuse. *h* is an inverted bell in the cistern, *g*, intended to spread the gas; so that it may be well washed with the naphtha, or with coal-tar and six per cent. of turpentine. *l* is a cock to try the height of the naphtha in the cistern, *g*; and *j* is a funnel, by which the naphtha enters that vessel. I is the outlet-pipe which conveys the gas to the condensers, where it may be stored for use without requiring purification.—*Mechanic's Magazine.*

WOODEN CAPS FOR BOTTLES.



At a Pharmaceutical Meeting held in December, 1851, the late Dr. Pereira exhibited some cork stoppers with wooden tops, which he had received from Messrs. Siemers and Co., of Hamburg, and which were figured in this Journal, vol. xi., p. 300. It was stated at the time that Mr. Gilbertson, of Ludgate Hill, manufactured compound stoppers of a similar description. These, however, were so expensive as to be inapplicable to many purposes for which they might otherwise have been introduced. Since that time the British manufacturers have given further attention to the subject, and the York Glass Company have recently introduced a screw cap and also a cap lined with cork, which are likely to be useful. Those made of boxwood are the best, but the price of boxwood being high at present, other kinds of wood are substituted for common purposes. Some caps are furnished with a layer of an elastic wadding on the upper surface inside, which being pressed down on the rim of the bottle by the force of the screw, affords an additional security. The cuts represent a bottle with a screw cap, and also one of the caps lined with cork on the rim inside without a screw.

APPARATUS FOR DISENGAGING SULPHURETTED HYDROGEN IN CHEMICAL LABORATORIES AND FACTORIES.

BY R. FRESENIUS.

Every one who has worked in an analytical laboratory well knows the disagreeableness which attends the use of small glass apparatus for the disengagement of sulphuretted hydrogen, especially such as do not admit of the current of gas being regulated or stopped at will.

In order to put an end to these difficulties I have constructed a large apparatus of lead, which, when charged, yields a supply of this gas sufficient for several weeks, and renders its application so convenient that nothing further can be desired. Since at the same time this apparatus obviates any waste of sulphuret of iron or acid, and reduces the unpleasant smell to a minimum, I feel myself justified in recommending it to the attention of all those who require to make frequent use of this gas in considerable quantities.

The construction of my apparatus is represented in the accompanying figures. Fig. 1 shows the entire arrangement of the apparatus, while fig. 2 shows the section of the actual generator.

a, *b*, *c*, *d*, and *e*, *f*, *g*, *h*, are two large cylindrical vessels of equal size, and made of lead soldered with pure lead. Their diameter is thirty centimetres, and their height thirty-three centimetres. *i* is a perforated shelf of lead about four or five centimetres apart from the true bottom, and resting upon leaden feet both at the sides and centre. The holes have a diameter of one and a half millimetres. At *k* is the opening for introducing the sulphuret of iron. Its diameter is seven centimetres, and is closed by means of a flat ground stopper, screwed down with a greased leather washer between the two surfaces.

Fig. 1.

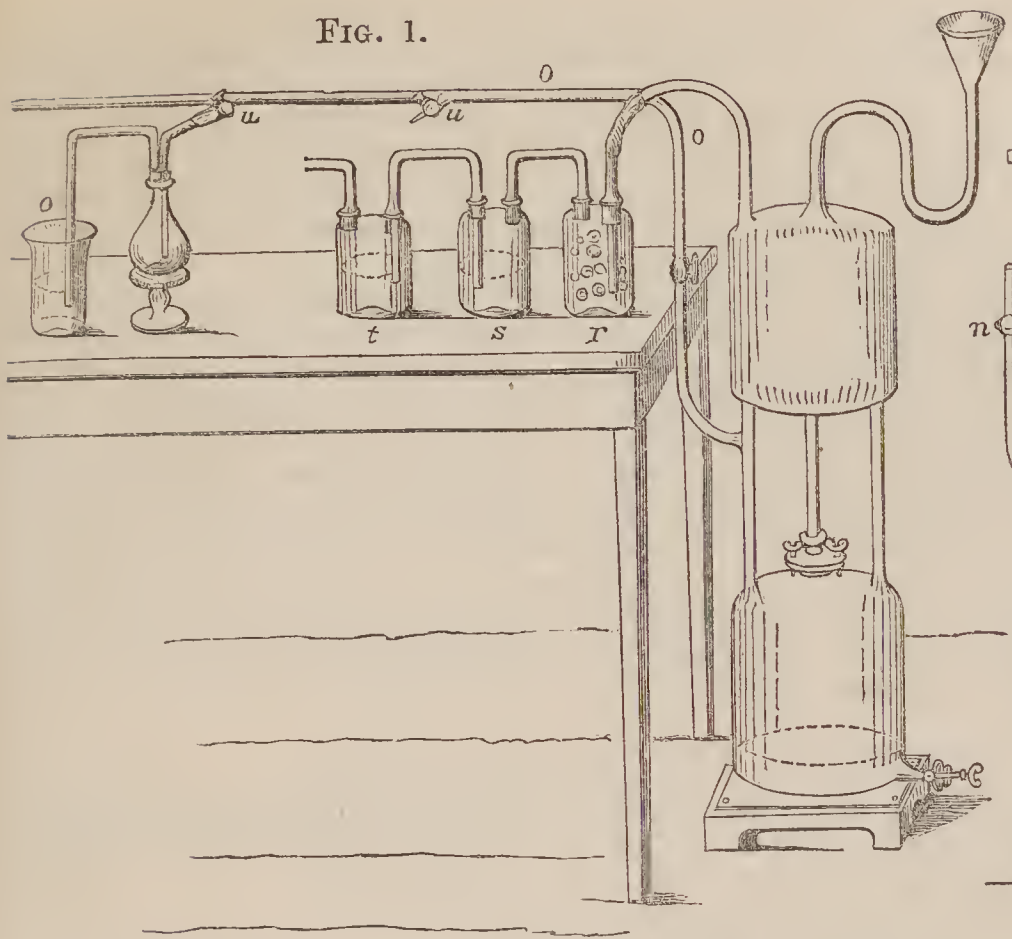
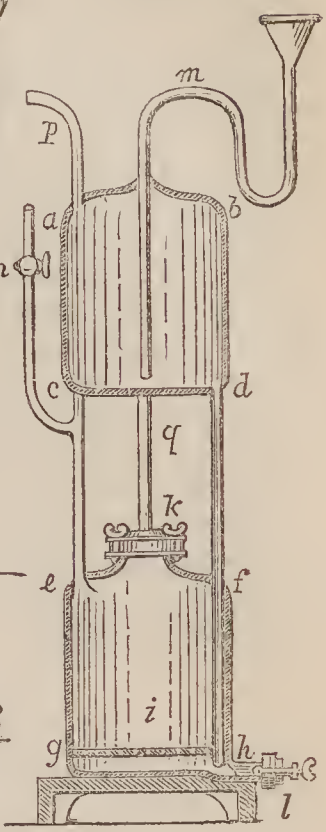


Fig. 2.



l is the opening for running off the sulphate of iron solution. It may be seen in the section that it is placed at a somewhat deeper part of the bottom, *g*, *h* ; the diameter of this opening is three centimeters. It is closed by means of a thick ground leaden stopper, pressed down upon its mouth by a screw. The arrangement of the filling tube *m* is sufficiently evident from the drawing, as is likewise that of the tube *d*, *h*, which is destined to convey the acid from the upper into the lower vessel, and from this into the former. It will be noticed that it extends into the deepened part of the bottom *g*, *h*, but does not actually touch. The tube *c e* is closed at the top, and therefore does not communicate in any way with the upper vessel. It is intended to convey off the gas disengaged in *e*, *f*, *g*, *h*, and with that view is furnished with a lateral tube *o*, which can be closed by the cock *n*. The use of the tube *p* will be seen below. The tube *q* is closed at both ends, and serves only as a support. These tubes are all sixteen millimetres internal diameter, and should not be too thin in substance.

When the apparatus is to be filled it is done in the following manner :—3.3 kilogrammes of melted sulphuret of iron, in small fragments, is introduced through the opening *k*, so as to rest upon the perforated shelf *i*, when *k* is carefully closed, *l* of course being likewise closed. The cock *n* is then closed, and *a*, *b*, *c*, *d*, filled with dilute sulphuric acid by pouring through the funnel first seven litres of water, and then one litre of concentrated sulphuric acid. The air contained in *a*, *b*, *c*, *d*, escapes meanwhile through the tube *p*, even when it is connected with the bottles *r*, *s*, *t*. When now the cock *n* is opened as well as one of the cocks *u*, the acid flows through the tube *d*, *h*, into the vessel *e*, *f*, *g*, *h*. At first air escapes from the tube *o*, and then sulphuretted hydrogen as soon as the acid comes in contact with the sulphuret of iron ; after a time all the air is driven out. As is seen in fig. 1, the tube *o* is bent and carried along horizontally. To it are attached as many ordinary brass cocks, *u*, *u*, as may be desired. They are connected with washing bottles in the manner represented by means of a piece of vulcanized caoutchouc tube. When the cock *u* is opened as well as the cock *n*, a stream of gas, of any desired amount, is obtained, which continues perfectly uniform for days.

When the cocks *u* are closed, the gas disengaged in *e*, *f*, *g*, *h*, presses the acid upwards through the tube *h*, *d* ; and when the sulphuret of iron is no longer immersed in the acid the action ceases. This, however, does not take place instantaneously, for there is always some acid left adhering to the sulphuret, and small fragments of the latter fall through the holes of the shelf, and maintain the action for a certain

time. Since the gas can no longer escape through *o*, it presses the liquid in *h*, *d*, upwards, bubbles up through the acid contained in *a*, *b*, *c*, *d*, and escapes through *p*. In order to prevent this gas from being lost and contaminating the air, the bottles *r*, *s*, *t*, are attached; *r* contains cotton wool, which supplies the place of water in an ordinary washing bottle, as water would readily run back into the apparatus; *s* and *t* are charged with solution of ammonia in such quantity as to be entirely contained by either bottle, for as the stream of gas is here intermittent, the liquid may be forced backwards and forwards from one bottle to the other.

A constant supply of sulphuret of ammonia is thus obtained as a bye product.

When at last the disengagement of gas ceases the acid has been all consumed, but not the sulphuret, which is equivalent to double the above quantity of acid. It is, therefore, necessary to run off the solution of sulphate of iron. This is done in the following manner:—All the cocks *u* are closed, *n* left open, and a dish placed under *l*, which is opened, and then one of the cocks *u* opened. As soon as the air enters the liquid runs off rapidly, and when it is all removed the edges of the opening *l* are washed with water, it is again closed, and another quantity of acid added as before.

I should not recommend the use of stronger acid, for in that case the sulphate of iron would crystallize. The brass cocks do not suffer at all from the sulphuretted hydrogen, and I have found that the apparatus answers all reasonable expectations. —*Journal für praktische Chemie*, 1853.

THE SLIPPERY ELM.—ULMUS FULVA.

The bark of this tree is extensively used in the United States, and has lately been ordered in this country. The inner bark is the part employed. It is a demulcent, and is recommended in diseases of the mucous membranes.

Infusion of the Slippery Elm Bark:—

℞ The bark bruised, one ounce.
Boiling water, one pint.

Macerate for two hours and strain. To be used freely as a demulcent.—U.S. Ph.

Mr. Ure has found a poultice of the slippery elm bark beneficial. It is made by stirring the powder in a sufficient quantity of hot water. It is a soothing application to irritable ulcers, &c.

LEAVES OF THE ASH-TREE.

It is more than probable that the leaves of the ash-tree will be placed in the Materia Medica amongst other medicinal plants at present in use, as therapeutic agents. Several Physicians in France have employed these in the treatment of gout and rheumatism, with a considerable amount of success, and at the present time they are engaged in carrying out their experiments with them, and in further investigation as to the medicinal properties and uses of the leaves of this plant, with a view to ascertain with accuracy their value as remedial agents in the diseases above mentioned. As might be expected from the part of the plant employed (the leaves), the form of the medicine is that of infusion, prepared by means of boiling water, which is then strained, and subsequently sweetened to taste.—*Dublin Medical Press.*

GENERAL PROCESS FOR THE DETECTION OF ALKALOIDS IN CASES OF POISONING.

BY STAS.

The method which I adopt for detecting the presence of alkaloids in animal substances is scarcely at all different from that employed in the preparation of these alkaloids from their respective plants. The only difference consists in the mode of obtaining them in a free state and separable by solvents.

It is known that the alkaloids form acid salts soluble in alcohol and water, and that solutions of these salts may be decomposed in such a manner that the liberated bases remain for a time or permanently dissolved in the liquid. I have, moreover, ascertained that most of the solid and volatile alkaloids, when in a free state and dissolved in a liquid, may be extracted by ether when this is present in sufficient quantity.

It is therefore necessary, in order to extract an alkaloid from an animal substance, to find some means of separating the adventitious substances, and a base which sets the alkaloid free, dissolving it so as to be taken up by ether.

When the substance to be examined is successively treated with water and alcohol of different strengths, this is sufficient to effect their separation, and to obtain a small volume of liquid which must contain the alkaloid.

Bicarbonate of potash or soda or the caustic alkalies are well adapted to set the alkaloid free and to retain it in solution, especially when the latter were combined with an excess of tartaric or oxalic acid.

In order to precipitate the animal or other substances from the suspected objects, it is customary to employ tribasic acetate of lead, and to remove the excess of lead by sulphuretted hydrogen, but this mode of proceeding is attended with many inconveniences. The tribasic acetate of lead does not immediately precipitate all foreign substances; further, the sulphuretted hydrogen which is employed for the separation of the lead remains intimately combined with certain organic substances which, under the influence of the air and a moderately elevated temperature, are extremely liable to decomposition. On this account the liquid filtered from the sulphuret of lead becomes rapidly coloured on exposure to the air, disengaging at the same time a stinking odour, which adheres with great pertinacity to the substances extracted from it.

The use of the lead salt has another disadvantage, namely, the introduction of a foreign metal into the substances to be examined, so that this portion of them is not in a fit state to be examined for inorganic substances. The successive treatment with water and alcohol admits of the detection of these substances, whatever may be their nature.

It is sufficiently well known that in medico-judicial investigations charcoal cannot be used as a decolourizing agent, since it retains the alkaloids as well as the colouring matters. Bearing in mind these facts, the course of analysis which I adopt is the following:

Let us suppose it is required to search for the presence of an alkaloid in the contents of the stomach or the intestines. The substance is in the first place treated with double its weight of pure absolute alcohol; then, according to the quantity of liquid, from half to two ounces of tartaric acid or oxalic acid is added—tartaric acid is to be preferred—the mixture is then introduced into a flask and heated to 140° or 167° F. When perfectly cold it is filtered through Swedish paper, the undissolved part washed with absolute alcohol, the clear filtrate evaporated in a vacuum or exposed to a rapid current of air at a temperature not exceeding 95° F.

When this operation is carried on with an organized tissue, as the substance of liver, heart, or lungs, it is requisite to reduce them to a very minute state of subdivision and perfectly extract all soluble substances by alcohol. The liquid thus obtained is treated as a mixture of the suspected substance and alcohol.

If the residue obtained by the evaporation of the alcohol contains fat or other insoluble substances, it must be poured upon a filter moistened with water, and evaporated almost to dryness in a vacuum or over sulphuric acid. The residue is then extracted with cold absolute alcohol, the adhering alcohol separated by exposure to the air, the residue dissolved in the smallest quantity of water, the solution introduced into a test tube, and pure powdered bicarbonate of soda or potash added until there is no longer any disengagement of carbonic acid. The whole is then mixed with four or five times its volume of pure ether, shaken, and allowed to stand for some time. When the ether has become perfectly clear a small quantity of it is decanted off into a watch-glass and allowed to evaporate spontaneously in a very dry place.

Two cases are now possible: the alkaloid present in the substance examined may be either liquid and volatile or solid and fixed.

DETECTION OF A LIQUID AND VOLATILE ALKALOID.

Let us suppose that such an alkaloid is present. Then on the evaporation of the ether the whole surface of the watch-glass will be covered with minute streaks of liquid, which will gradually collect at the bottom. The mere heat of the hand will cause the disengagement of an unpleasant odour, which, according to the nature of the alkaloid, will be more or less piquant or irritating; in short, the odour of a volatile alkaloid somewhat disguised by an animal odour. When indications of such an alkaloid are perceived there must be added to the contents of the flask, of which only a small quantity has been used, one or two cubic centimetres of caustic potash or soda, and the whole well shaken. After standing some time the ether is to be

decanted into a small test-tube, the residue treated three or four times with fresh ether, which is all introduced into the same vessel. Into this ethereal liquid, which contains the alkaloid in solution, one or two cubic centimetres of water acidulated with one-fifth its weight of pure sulphuric acid is poured, the whole shaken, allowed to stand till clear, the ether then decanted, and the acid liquid washed with a fresh quantity of ether; as the sulphates of ammonia, nicotine, aniline, chinoline, picoline, petinine are quite insoluble in ether, the acid liquid will contain the pure alkaloid in a small volume and as a sulphate; sulphate of conia is soluble in ether, consequently a small quantity of it may be removed, but the principal part always remains in the aqueous liquid. The ether, on the other hand, contains all the animal substances which have been dissolved from the alkaline liquid. On evaporating it there remains a slightly yellowish residue of a disagreeable animal odour, and mixed with a small quantity of sulphate of conia when this alkaloid was present in the substance analysed.

In order to separate the alkaloid from its solution in sulphuric acid, a concentrated solution of caustic potash or soda is added, and the free alkaloid extracted by ether, which is evaporated at the lowest possible temperature. The ammonia always present passes off with the ether while the alkaloid remains behind. The last traces of ammonia are to be removed by a momentary exposure to a vacuum over sulphuric acid.

In March, 1851, I employed this process in the examination of the heart blood of a dog which had been poisoned by two cubic centimetres of nicotine, and I was able to detect the presence of this poison in the blood with the greatest certainty. Thus I was able to recognize its state of aggregation, its odour, taste, and alkaline action; I obtained perfect crystals of platino chlorate of nicotine—four-sided rhombic prisms of a dark green colour, and I was able to prove its insolubility in alcohol and ether.

By means of this process I detected in a very old tincture of hemlock, liquid and colourless conia, presenting all its physical and chemical characters. I found, however, that in the spontaneous evaporation of an ethereal solution of this alkaloid a considerable quantity is lost.

DETECTION OF A SOLID AND NON-VOLATILE ALKALOID.

When such an alkaloid is present, it may happen that at the above stage of the process the ether with which the liquid is treated after neutralization with bicarbonate of soda, may or may not leave a residue. In the latter case caustic potash or soda is added to the liquid, after which it is shaken with ether, which dissolves the liberated alkaloid. In any case the liquid is perfectly extracted with ether, and whichever reagent may have been employed for setting free the alkaloid, there remains after the evaporation of the ether sometimes a solid substance, but generally a colourless milky liquid containing suspended solid substance. This substance possesses an unpleasant animal odour, and gives a distinct and permanent blue colour to litmus.

The presence of a solid alkaloid having been ascertained, it must next be crystallized for the purpose of determining its form. This is effected by dissolving a portion in alcohol and allowing it to evaporate spontaneously. However, it rarely happens that the above operations furnish the alkaloid so pure as to crystallize it, being almost always more or less mixed with other substances. In order to separate these, a few drops of very dilute sulphuric acid are poured into the capsule and shaken about. Generally the acid liquid is observed not to wet the sides of the vessel. The liquid separates into two layers; one, consisting of fat, adheres to the sides of the capsule, the other containing the alkaloid. This acid liquid, which must be transparent and colourless, is poured carefully off the capsule, rinsed with a few drops of acidulated water, and the whole evaporated to one-fourth in a vacuum over sulphuric acid. A very concentrated solution of pure bicarbonate of potash is then added to the residue, and the whole treated with absolute alcohol. The alkaloid is dissolved, while sulphate of potash and the excess of bicarbonate remain behind. By evaporating the alcoholic solution crystallized alkaloid is obtained.

It is now necessary to determine the characters of the alkaloid in order to ascertain its individuality.

I have applied the above method to the detection of morphine, codeine, strychnine, brucine, veratrine, emetine, colchicine, aconitine, atropine, hyoscyanine, and have always succeeded in isolating them without the least difficulty.—*Journal de Pharmacie et de Chimie, October*, 1852.

REMARKS ON THE ARTIFICIAL PRODUCTION OF SALTPETRE.

BY R. REICHENBACH.

It is only within the last few years that general assent has been given to the opinion that the production of saltpetre consists in an oxidation of ammonia, determined or facilitated essentially by the presence of alkaline or earthy bases.

The occurrence of native saltpetre is well known to be intimately connected with the decay and disintegration of calcareous rocks, especially felspathic limestone, which are at the same time more or less rich in organic remains, and consequently contain a certain amount of nitrogenous substance. It is this animal substance, which at a sufficient temperature suffers chemical change; that is to say, passes more or less rapidly into putrefactive fermentation, the nitrogen being either wholly or principally converted into carbonate of ammonia. Under ordinary circumstances, this volatile ammoniacal salt gradually escapes into the atmosphere; but when generated with a porous mass of rock, which admits of the penetration of atmospheric oxygen, it suffers a partial decomposition and oxidation to nitrate of ammonia as well as nitrates of lime and potash.

It is, moreover, a general fact that whenever animal substance is brought into immediate contact with potash, lime, and sand, and the whole exposed to the air, there is an abundant formation of nitrates, and this observation has afforded both an explanation of the mode in which saltpetre is formed spontaneously and a means of obtaining it artificially. It has been found to be a condition of considerable importance that the heaps of substances prepared for the production of nitric acid should possess a certain degree of porosity, so that a very large surface may be exposed to the air absorbed.

The statement of these few facts connected with the artificial production of saltpetre will suffice for a consideration of the question, Whether this process corresponds to the present state of technical chemistry, or whether it is not capable of great improvement? On examining the process in detail it will be found,

1. That the mixture of the several substances is generally conducted with too much irregularity and uncertainty, so that it is difficult to ascertain whether they are in a proper proportion.

2. That the presence or preponderance of inorganic substances, although in one respect unavoidable, retards the progress of the putrefaction, and consequently the production of ammonia, from which alone the nitric acid is formed, and it is probably owing to this circumstance that the artificial production of saltpetre goes on with such remarkable slowness.

3. The uniform maintenance of a proper temperature is not sufficiently observed.

4. Since it has become evident that the presence of ammonia is the essential condition of the formation of nitric acid, it is possibly not necessary to produce the ammonia by putrefactive fermentation. There are many other sources from which it might be more readily obtained, and then submitted in a pure state to those conditions under which it is converted into nitric acid, and thus the whole operation would be simplified and rendered independent of local and accidental influences.

When, as in some parts of the continent, the production of saltpetre is made a collateral operation of agriculture, in which case space and time are of less importance, the old process is sufficient. But the case is different when it is required to produce a certain large quantity of saltpetre annually.

First, then, as regards the present process, it must not be forgotten in the mixing of the substances to make a nitre bed that the production of nitrate of potash is the ultimate object. Consequently this base must be present in some appropriate form and in sufficient quantity. It is best to use the lime in the caustic hydrated state. It might be possible to produce, in the first instance, nitrate of lime and then nitrate of potash by a subsequent double decomposition, but it would appear, *à priori*, improbable that the lime alone would be so effective in determining the formation of nitric acid as the mixture of lime and potash. This point is one which is certainly deserving of experimental investigation.

Assuming, then, that ammonia and potash are the two substances chiefly necessary for the production of saltpetre, it remains only to ascertain the precise conditions of its formation, and to ensure an adequate supply of these substances so as to be able to carry out the fabrication of saltpetre to any extent and with any degree of rapidity.

It is worth the attempt to ascertain whether the potash required may not be derived from certain rocks, especially granite, syenite, trachyte, porphyry, basalt, &c. It is probable that these substances, when reduced to a coarse powder and mixed with a proper proportion of caustic lime, would gradually yield up their potash, while the silicic acid combined with the lime. The native saltpetre of India is produced during the decay of a limestone containing potash.

Ammonia is now so abundant a product of technical processes, that there is little fear of obtaining it in sufficient quantity. In very many instances where it is now lost it would then be worth collecting; and if all sources were exhausted there would be no great difficulty in obtaining it from the atmospheric nitrogen. Ammoniacal gas is very copiously formed when a mixture of nitrogen and water vapour is passed over a mixture of carbon and carbonate potash at a red heat.

There are likewise two other possible sources of nitrate of potash, which, although at present possessing rather a theoretical than practical interest, ought not to be passed over.

When ammoniacal gas, mixed with oxygen, is passed over ignited spongy platinum, there is formed a considerable quantity of nitrate of ammonia, a salt which may readily be converted into nitrate of potash. It yet remains to be ascertained in what proportion this formation of nitric acid stands to the consumption of fuel, to the mass and condition of the platinum, and the duration of its activity, circumstances which will determine its applicability.

Ignited peroxide of iron exercises a precisely similar action upon ammonia in the presence of oxygen, and consequently, on account of its greater abundance, will be more deserving of study in this respect.

There is, moreover, a fact long since observed by Cavendish, that by passing a number of electrical discharges through a mixture of nitrogen and oxygen, in the same proportion as in atmospheric air, a small quantity of nitric acid or nitrate of ammonia is formed. When the gaseous mixture contains hydrogen, the formation of nitric acid is remarkably facilitated, a circumstance which appears to be closely connected with the formation of traces of nitric acid during the combustion of hydrogen in ordinary air. — *From the Jahrbuch der k. k. geologischen Reichsanstalt Jahrg.* I., No. 2.

THE NITRE CAVERNS OF THE INDIAN ARCHIPELAGO A PROBABLE SOURCE OF GUANO.

Mr. G. W. Earl, of Hampstead, in a communication which appeared in *The Times* of August 18th, has directed attention to the limestone caverns of the Indian Archipelago, as a probable source from which supplies of guano may be obtained. He states that in these caverns "the deposits appear to be of immense extent; indeed, those of the East India Company's territories in the neighbourhood of Burmah would alone supply cargoes for many thousand tons of shipping." Hitherto these deposits have been employed only as a source of nitre; but, as they chiefly consist of the excrements of birds and other animals, Mr. Earl suggests that they may be found to possess the fertilizing properties of Peruvian guano. The following extracts are given by Mr. Earl in confirmation of his statements:—

Extract from a *Voyage to New Guinea, &c.*, by Captain Thomas Forrest, H.E.I.C.S. London, 1779. [The part from which the extract is taken describes a visit to a cavern in the island of Mindanao]:—

"From the hall I passed, on the same level, into a crooked gallery, in length about 200 yards. It was seven or eight feet broad, and from six to eight or ten high. The sides and top looked like dirty freestone; the floor was perfectly level, and, in most places, miry to the ankles. Around us flew an infinite number of small bats,* from which I defended myself with the lighted torch I carried in my hand. Many of these birds of darkness clung by little hooks at their wings to the sides of the passage. I might have gone further, but declined it. Returning, I saw the entrance into another passage, and felt a very small draught of air, which made the torches burn. This passage, I was told, went a good way, and gave another outlet; but at

* Combes says, in the caves of Mindanao are bats as large as fowls, and that saltpetre is made of their excrement.—Page 188.

a distance so great that none of my guides had ever ventured to explore it. As I went in barefooted, I found the miry stuff stick to my feet. Being very glutinous, it was not easily washed off. To make saltpetre they mix one measure of this stuff with two of wood ashes, and then filter it through the water of which the saltpetre is made. The gunpowder they make here is very coarse grained."

Extract from Marsden's *History of Sumatra*. London, 1814 :—

"In the country of Kuttaum, near the head of the Urei river, there are extensive caves, from the soil of which saltpetre is extracted. Mr. Whalfeldt, who was employed as a surveyor, visited them in 1773. Into one he advanced 743 feet, when his lights were extinguished by the damp vapour. Into a second he penetrated 600 feet, and after getting through a confined passage, about three feet wide and five in height, an opening in the rock led to a spacious place forty feet high. The same caves were visited by Mr. Christopher Terry and Mr. Charles Miller. They are the habitation of innumerable birds, which are perceived to abound the more the further you proceed. Their nests are formed about the upper parts of the cave, and it is thought to be their dung, simply, that forms the soil (in many places from four to six feet deep, and from fifteen to twenty broad) which affords the nitre. A cubic foot of this earth, measuring seven gallons, produced, on boiling, 7lb. 14oz. of saltpetre, and a second experiment gave a ninth part more. This I afterwards saw refined to a high degree of purity ; but I conceive that its value would not repay the expense of the process."—P. 173.

Extract from Crawfurd's *History of the Indian Archipelago*. Edinburgh, 1820 :—

"The process of manufacturing saltpetre and gunpowder will demand a short account. Saltpetre is obtained by boiling the soil of the caves frequented by bats and birds, chiefly swallows. The soil is the decomposed dung of these animals, which commonly fills the bottom of the caves to the depth of from four to six feet." —Vol. i., p. 200.

Extract from the Rev. F. Mason's *Natural Productions of Burmah, or Notes on the Fauna, Flora, and Minerals of the Tenasserim Provinces and the Burman Empire*. Maulmain, 1850 :—

"CAVE BAT."

"Every one who visits the limestone caves of the Tenasserim coast is startled with their bat-wing music. Suddenly, on entering these subterranean halls, thousands of bats rush from their dark recesses, and wheel over the traveller's head with the deep whizzing sounds of a passing water-spout. And then they hang trembling and rustling their wings in the lofty black galleries above, like a choir of wind harmonies muffled in the mountains. The large quantities of guano accumulated in the caves inhabited by these bats might be turned to a profitable account by our horticulturists."—P. 222.

Extract from a journal kept during a visit to the river Barram, on the north-west coast of Borneo, in the Hon. Company's steamer Pluto. From the *Journal of the Indian Archipelago*. Singapore, 1851. [The paragraph from which the extract is taken describes a visit to one of the limestone caverns near the banks of the river] :—

"By the imperfect light we could only distinguish masses of uneven rock on either side. As we advanced towards the spots where the birds' nests are found, the ground became covered, apparently many feet deep, with guano of the swallow, which emitted scarcely any smell."—Vol. v., p. 687.

ON THE PURIFICATION OF GLYCERINE, AND ITS EMPLOYMENT IN THE ARTS.

Report by M. Chevallier on a Paper by M. Bruère-Perrin.

It is well known that the discovery of glycerine dates from 1782 or 1783; that it is due to Scheele, who made known the fact that oils and fats contain a saccharine matter which is obtained by treating two parts of oil with one part of litharge, adding some water, and applying heat, and afterwards separating and purifying the saccharine matter which is found in the mother-liquor. Scheele published the results of his investigations on this subject in a communication bearing the title *De Materiâ Saccharinâ peculiari Oleorum expressum et pinguedinum*, which appeared

in the *Transactions of the Royal Academy of Sweden*, in 1783. In this publication Scheele gave the name of *sweet principle of oils* to glycerine, from the fact of its having a saccharine character, and of its solution yielding a syrupy product on being evaporated.

The discovery of Scheele was circulated through the scientific journals, and especially Crell's Journal for 1784, and afterwards the Chemical Works of Bergmann, edited by Guyton de Morveau.

By the subsequent extension of scientific investigation it was established that oils are composed of fatty acids and glycerine, and that the latter, which plays the part of a base, is separated in saponification.

Glycerine, although it has been well known to Chemists, and although it has been produced in very large quantities since the development of the industrial arts in France, was not employed; being considered a product of the laboratory—curious, but not susceptible of any useful application.

The first use to which glycerine was applied was in medicine;—in fact, the sweet principle of oils was first employed as a remedy for diseases of the ear by an English surgeon. This application of it having been made known, the attention of medical men was directed to glycerine, and soon afterwards it was recommended as a valuable application for diseases of the skin. Trials of it were made in Paris by Bazin and Cazenove; in London by Yearsley, Wakley, and others; and in Russia by Dr. Dallas, of Odessa, who without hesitation pronounced glycerine to be the best of cosmetics. It was established from the experience of these medical men that glycerine when applied to the skin penetrates and softens it, and promotes cicatrisation of cracks and fissures.

The memoir of M. Bruère-Perrin relates to the means of purifying glycerine. It is known that as usually obtained it has a disagreeable odour, and that it has been proposed to purify it by passing through it a current of carbonic acid gas to precipitate the lime which it contains. According to M. Bruère-Perrin this mode of operating only removes the excess of lime present and not that combined with fatty acids.

M. Bruère-Perrin adopts the following method for effecting the object required:—1st. He determines, by means of oxalic acid, the quantity of lime existing in the liquid to be purified. 2nd. The proportion of lime being thus determined, he adds to the liquid a quantity of sulphuric acid sufficient to convert the lime into insoluble sulphate of lime. 3rd. He then concentrates the liquor in a tinned copper pan, stirring it briskly during the concentration by means of an agitator kept in motion by machinery. During the concentration there is a disengagement of vapours, having a disagreeable odour, and a partial decolouration of the liquid takes place at the same time. 4th. When the liquid has acquired a density of 1.075, it is allowed to cool, and then passed through a filter, to separate the sulphate of lime; the excess of acid which has been used in the previous part of the process is now saturated with carbonate of potash, and the liquid again evaporated with constant agitation until it has a specific gravity 1.19, when it will deposit a certain quantity of sulphate of potash in a gelatinous mass; it is then allowed to cool, strained, and the deposit washed with a small quantity of water to which a little spirit has been added. 5th. It is again evaporated, still keeping it agitated, and after bringing it to a specific gravity of 1.24 while hot, it is left to cool, when a further precipitation of sulphate of potash takes place, from which it is filtered.

The product resulting from these operations is of an amber colour, free from any marked odour, having a sweetish taste, and being unctuous to the touch. In this state it is treated while cold with animal charcoal, and filtered. It is now free from colour or any sensible odour.

Glycerine, like water, mixes with aqueous liquids, with alcohol, and with acetic acid; it moistens bodies without rendering them greasy; like oil, it is unctuous to the touch, and does not evaporate when exposed to the air. It is easily charged with the aroma of volatile oils; it does not become rancid, nor does it ferment.

M. Bruère-Perrin has introduced glycerine into toilet soaps, and has used it in the preparation of cosmetic vinegar, aromatized spirits, and several other articles of perfumery. We are assured that the soap with glycerine retains its original soft consistence, and that the unctuosity of the glycerine is imparted to the skin. We have tried several of these preparations and verified the descriptions given of them. —*Journal de Chimie Médicale.*

ON THE MEANS OF DETECTING PICRIC ACID IN BEER.

BY M. J. L. LASSAIGNE.

It was stated about a year ago, in the *Journal de Chimie Médicale*, that picric acid was sometimes used as a substitute for part of the hops in the manufacture of beer. This adulteration, which has been adopted in some localities, cannot be tolerated, and it was with the view of putting a stop to such a practice that the following experiments were made.

The bitter taste of picric acid, which has the same character as that of the hop, cannot be distinguished by the taste from the latter when contained in beer, as I have satisfied myself by direct experiment; but its presence may be detected by some simple chemical reactions.

In studying the properties of picric acid, I have observed that this acid, which communicates its colour and bitterness to water, when dissolved in beer is not precipitated by subacetate of lead, while the bitter principle and the colour of the hop are almost entirely removed by that reagent. I have also observed that animal charcoal, whether purified or not, is capable of absorbing and removing the colouring matter of beer, while picric acid is unacted upon by it, the liquor retaining its original colour unaltered by the charcoal.

It is on the properties possessed by these two reagents that I have founded the means of detecting small quanties of picric acid when added to beer.

In the experiments I have made on this subject I have operated on pure beer of good manufacture, and on some to which I have added $\frac{1}{12000}$ and even $\frac{1}{18000}$ of picric acid. On adding to both samples an excess of tribasic acetate of lead, or agitating them with excess of animal charcoal, the pure beer is almost completely decolourized, while that containing the picric acid in the proportions mentioned, retains a citron yellow colour in consequence of the picric acid not being removed.

For the detection of a smaller proportion of picric acid in beer than that above mentioned, it is necessary to concentrate the liquid before adding the reagents.—*Journal de Chimie Médicale.*

ON THE PREPARATION OF CHROME YELLOW.

BY RIOT AND DELLISSE.

For some time this pigment has been adulterated with as much as fifty per cent. of artificial sulphate of lead. This addition communicates very objectionable properties, for it is then difficult to use, and does not cover well; but it admits of a considerable reduction in the price of the yellow, the pure substance costing 350 francs for 100 kilogrammes, the impure substance but thirty-five francs for the same quantity. The latter, however, is practically the dearest, for it covers a less surface, and the colour is less durable.

It is evident that the substance which communicates the colour to chrome yellow is the chromic acid, that is likewise what causes its high price; while the cheaper oxide of lead communicates the valuable property of covering well. We therefore proposed to ascertain whether the colour of the chrome yellow would remain the same when the proportion of chromic acid, necessary to form chromate of lead, is diminished.

After a number of experiments we have ascertained that the proportion of chromic acid may be reduced to nearly one-half, and that twenty-five parts of neutral chromate of potash, instead of fifty-four parts for one hundred parts of chrome yellow, produce the same colour.

It was then necessary to ascertain whether the difference between twenty-five and fifty-four could not be made up by another substance, for instance, oxide of lead or a lead salt, so that the chrome yellow would be cheaper and at the same time cover well.

We, moreover, endeavoured to obtain a bye-product, which in the ordinary way is lost. That method, as is well known, consists in dissolving a certain quantity of acetate of lead in warm water, and decomposing it with a solution of neutral chromate of potash, by which means the acetate of potash is obtained in too diluted a state to repay the cost of evaporation.

The process which we adopt is the following :—The acetate of lead is dissolved in warm water, the quantity of sulphuric acid necessary to convert the oxide of lead

into sulphate is calculated and added: the clear liquid which remains after the precipitate has subsided contains the acetic acid, and may be drawn off and preserved for the preparation of acetate of lead. The sulphate of lead is then washed and treated with a hot solution of neutral chromate of potash, twenty-five parts being used for every seventy-five parts of sulphate of lead. The liquid then contains sulphate of potash, which may be made available, and the precipitate consists of chromate and sulphate of lead.

The product thus obtained covers as well as the pure chrome yellow, and has as good a colour, while it is much cheaper.—*Armengaud's Génie Industriel*, April, 1853.

MEANS OF FASTENING LEATHER UPON METAL.

The metal is washed with a hot solution of gelatine, and the leather previously steeped in a hot infusion of gall-nuts pressed upon the surface and allowed to cool. It then adheres so firmly that it cannot be separated without tearing.—*Allgemeine Polytech. Zeitung*, March, 1852.

ON THE PREPARATION OF ALKALINE CYANIDE FOR TECHNICAL PURPOSES.

BY R. WAGNER.

The author prepares this salt by melting together eight parts of dry ferrocyanide of potassium and two parts of dry carbonate of soda. The mixture of cyanides of potassium and sodium thus obtained, besides being much cheaper than the salt prepared according to Liebig's direction, is, according to the author, quite as suitable for all kinds of technical applications, electrotyping, gilding, silvering, &c.—Dingler's *Polytech. Journal*, vol. cxxiv., p. 446.

UNIVERSITY OF LONDON.

M.B. FIRST EXAMINATION, 1853.—EXAMINATION FOR HONOURS.

Friday, August 12.—*Morning*, 10 *to* 1.

CHEMISTRY.

Examiner, Professor Brande.

1. Explain and illustrate the meaning of the term *specific heat*, and state the relation which appears to subsist between the specific heat and the atomic weight of bodies.

2. Describe the general and distinctive chemical characters of the *organic alkaloids:* enumerate those used in medicine, giving the modes of obtaining them and their compounds, and of ascertaining their purity.

3. The mineral called *iolite* is a silicate of oxide of iron, magnesia, and alumina, and may be represented by the following formula :—

$$Fe\,O,\,Si\,O_2;\ +\ 3\ [Mg\,O,\,Si\,O_2]\ +\ 2\ [2\,Al_2\,O_3,\,3\,Si\,O_2].$$

Give the details of its quantitative analysis.

4. Contrast human urine with that of the graminivorus quadrupeds, stating the composition and properties of each of their characteristic ingredients, and the means of obtaining them pure.

Friday, August 12.—*Afternoon*, 3 to 6.

MATERIA MEDICA AND PHARMACEUTICAL CHEMISTRY.

Examiner, Dr. Owen Rees.

1. On what occasions and with what view does the London College direct protochloride of tin, metallic copper, metallic silver, and metallic gold, to be used in testing pharmaceutical preparations ?

2. What chemical and physical changes occur in rye during the formation of the ergot ?

3. Give the chemical history of Salicina, stating the changes effected in it by its passage through the system and by reagents out of the body. Mention the various sources from which it may be obtained.

4. How would you detect narcotina in morphia ; and cinchonia and quinidina in quina ?

5. State shortly the chemical qualities of the undermentioned preparations, giving

the specific gravity of each, and the pharmaceutical uses of Nos. 1, 2, 3, and 5. Describe the decomposition which takes place in the formation of No. 6.

1. Ammoniæ liquor	3. Acidum aceticum	5. Æther
2. Spiritus rectificatus	4. Liquor ammoniæ acetatis	6. Spiritus ætheris nitrici

A SUGGESTION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I think it highly important that the very valuable suggestion in this month's Journal, from Mr. Foster, of Collumpton, should not be lost sight of, viz., that the Council pay back all monies which have been received from those individuals who have by their factious and impertinent opposition not only attempted to disturb the harmony but to destroy the prosperity of the Pharmaceutical Society, on the condition that they will at once withdraw themselves altogether from it; and to prevent the funds of the Institution suffering (not that I think they could possibly be better employed, or expended more satisfactorily to the Members generally, or more advantageously to the best interests of the Society), I would propose that the sum necessary should be raised by voluntary subscription, and I feel convinced that there is scarcely a person connected in any way with the Society who would not gladly contribute to so very desirable an object. For my part I should feel a pleasure in giving three guineas, believing that it would be of more service than three times the amount applied to any other purpose.

I am, Sir, your obedient servant,

Huddersfield, August 2, 1853. John Read Dore, A.P.S.

NEW YORK EXHIBITION OF THE INDUSTRY OF ALL NATIONS.

CHEMICAL AND PHARMACEUTICAL PRODUCTS AND PROCESSES FROM THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

1. James Hawthorne, *inventor*, 78, Charrington Street, London.—New inks for staining oak and mahogany, with specimens of the stained woods.
2. George Lockett, *manufacturer*, Staffordshire.—Samples of colours on porcelain.
3. David Clarke, *inventor and manufacturer*, Bedfordshire.—Preparation to protect grain from smut and from the attacks of caterpillars.
4. Ellam Jones & Co., *manufacturers*, Markeaton Mills, Derby.—Mineral colours, raw and manufactured, for oil paints and paper-staining, mineral yellow, ochre, Indian red, vermilion, &c.
5. William Dawson, *manufacturer*, Leith.—Samples of colours and chemical productions.
6. Thomas and Henry Smith, 21, Duke-street, Edinburgh.—Specimens of aloin and caffeine.
7. Howards and Kent, *manufacturers*, Stratford.—Specimens of Peruvian cinchonine and quinidine barks; sulphates of quinine, cinchonine, and quinidine; Epsom salt; Rochelle salt; phosphate of soda; sulphate of iron; citric and tartaric acids; citrates and tartrates of iron; calomel; corrosive sublimate; red precipitate; borax; bicarbonates of potash and soda.
8. Dinneford and Co., *inventors and manufacturers*, New Bond-street, London.—A variety of chemical productions.
9. Thomas Jennings, *manufacturer*, Brown-street, Cork.—Calcined magnesia and carbonate of magnesia.
10. C. Allhausen and Co., Tyne Chemical Works, Gateshead.—Bicarbonate of soda.
11. Matthew Pound, 60, Leather-lane, Holborn.—East Indian drugs and medicinal plants.
12. Lea and Perrins, *manufacturers*, Worcester.—Drugs and chemical preparations.
13. George Shaw, *producer*, Glasgow.—Specimens of carbonate and calcined magnesia, and other chemical productions.
14. Trustees of the late J. Buckley, *manufacturer*, Manchester.—Crystals of sulphate of iron.
15. John Cooper, jun., *manufacturer*, Ashton, Cumberland.—Large crystals of sulphate of barytes.
16. John Clarke, *manufacturer*, Manchester.—Specimens of the various alkaloids.

17. James H. Kent, *producer*, Bury St. Edmunds.—Dried preparations of British indigenous plants; fluid extracts of taraxacum and colchicum; green and black tea shrubs.

In the class of chemical and pharmaceutical products, the United States has 51 exhibitors; Great Britain and Ireland (as above), 17; the Zollverein and Germany, 39; France, 16; Switzerland, 1; Holland, 5; Austria, 7; Italy, 10; and British Guiana, 18. Sweden and Norway, Belgium, Denmark, Mexico, Hayti, and Newfoundland, furnish no contributors to this class.

REVIEW.

A Dictionary of Arts, Manufactures, and Mines; *containing a clear Exposition of their Principles and Practice.* By Andrew Ure, M.D., F.R.S., &c. Illustrated with nearly 1600 Engravings on Wood. Fourth Edition.

The new edition of this work appears in a greatly enlarged form, consisting of two octavo volumes, and extending to more than two thousand pages. In a country, the prosperity of which depends so much upon its mines and manufactures as this country obviously does, the fact of such a work having reached a fourth edition, and extended to nearly double its original size, is not surprising, especially when the position and qualifications of the author are taken into account. Much, no doubt, of the matter has been taken from other works; this was unavoidable in so comprehensive an undertaking; but there is also a great amount of original information which could only be supplied by a man of great practical experience. There are few men in this country who would be capable, and no one more competent than the author, to describe our arts, manufactures, and mines. The author says, "I have embodied in this work the results of my long experience as a Professor of Practical Science. Since the year 1804, when I entered at an early age upon the arduous task of conducting the Schools of Chemistry and Manufactures in the Andersonian Institution, up to the present day, I have been assiduously engaged in the study and improvement of most of the chemical and many of the mechanical arts. Consulted professionally by proprietors of factories, workshops and mines of various descriptions, both in this country and abroad, concerning derangements in their operations, or defects in their products, I have enjoyed peculiar opportunities of becoming familiar with their minutest details, and have frequently had the good fortune to rectify what was amiss, or to supply what was wanting."

That the author has largely availed himself of the information thus acquired there is abundant evidence throughout the work, nor has there been any lack of industry in collecting from the best sources what was required to complete the details of the subjects treated of. Indeed, the work affords a striking testimony to the laborious industry which has been bestowed upon it.

In one respect, however, the opportunities of observation which the author has possessed, appear to have imposed some restraint upon him in regard to publication. He says, "I have gone as far in describing several curious processes, hitherto veiled in mystery, as I felt warranted, without breach of confidence, to go; regarding it as a sacred duty never to publish any secret whatever, without the consent of its proprietor. During my numerous tours through the factory districts of Great Britain, France, Belgium, Germany, and Switzerland, many suggestions, however, have been presented to my mind, which I am quite at liberty to communicate in private, or carry into execution in other districts too remote to excite injurious competition against the original inventors. I am also possessed of many plans of constructing manufactories, of which the limits of these volumes did not permit me to avail myself, but which I am ready to furnish, upon moderate terms, to proper applicants."

This statement seems likely to excite in the minds of the readers an apprehension that many points essential to the success of the processes described have been kept in reserve, and it cannot fail to weaken confidence in the descriptions given. We believe, however, that the author's remarks apply only to such details as have never been published, and although the knowledge of the existence of such restraint must detract from the value which the known experience of the author would otherwise confer on his writings, we can find no evidence in the work of any deficiency of information.

In some of the articles there is, perhaps, a little indication of the influence of personal feeling, which is much to be regretted. Thus, under the article "Coal," some space is devoted to a criticism upon the Admiralty Report, drawn under the

direction of Sir H. de la Beche and Dr. Lyon Playfair, on the heating powers of different kinds of coal. "Of this report," it is stated, "we will venture to say at once, that a more garbled, more inaccurate, and less impartial job was never exhibited—nay, not even in the House of Commons." We should have thought this sufficient to justify its exclusion from a book purporting to contain none but sound information, yet of the article on the subject we are elsewhere told, "that there is nothing personal in the language is clear from this, that it is an exact transcript of the original Government Report." We do not regret the insertion of the Report, but doubt the policy of inserting it with such a designation. We may add, however, that in addition to this report, the work contains a large amount of valuable information on coals and coal-gas.

The present edition contains notices of many novelties of an interesting and useful nature, which were first displayed at the Great Exhibition in 1851. It also contains descriptions of some recently patented processes. Of this class of matter the author says, "May I venture to point attention to the very insecure tenure by which patents for chemical or chemico-mechanical inventions are held; of which there is hardly one on record which may not be readily evaded by a person skilled in the resources of practical chemistry, or which could stand the ordeal of a court of law directed by an experienced Chemist. The specifications of such patents stand in need of a thorough reform; being for the most part not only discreditable and delusive to the patentees, but calculated to involve them in one of the greatest of evils—a chancery suit." We were not aware that experienced practical Chemists possessed such fearful powers.

Considering the great amount and value of the information contained in this Dictionary, which have been greatly enhanced by the additions of new matter which have been made to it, we do not doubt that it will become more than ever a work of reference to manufacturers, metallurgists, and tradesmen.

A Manual of Materia Medica and Therapeutics, *including the Preparations of the Pharmacopœias of London, Edinburgh, and Dublin, with many new Medicines.* By J. Forbes Royle, M.D., F.R.S. Small 8vo, pp. 801. Second edition. London: John Churchill, Princes Street, Soho.

This work has been for a considerable time out of print. It has been very much wanted, and we recommend it to those students who desire a work less expensive than Dr. Pereira's *Elements.*

Memoirs of a Stomach, *written by Himself, that all who eat may read. With Notes, Critical and Explanatory.* By a Minister of the Interior. London: Published by W. E. Painter, 342, Strand. 1853.

On the Prevalent Treatment of Disease. Two Lectures, delivered in the Theatre of the Royal College of Surgeons, in July, 1853. By Frederic C. Skey, F.R.S., Professor of Anatomy and Surgery to the College, &c., &c. London: Chapman and Hall, 193, Piccadilly. 1853.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., Cantab., &c., and C. B. Radcliffe, M.D., Lond., L.R.C.P. Vol. 17. London: John Churchill, Princes Street, Soho; Edinburgh: Maclachlan and Co.; Dublin: Fannin and Co. 1853.

THE PATENT MEDICINE LICENCE.

Pharmaceutical Chemists are reminded that this Licence becomes due on the 1st of September.

TO CORRESPONDENTS.

H. I. C. (Derby).—The term "parts," when applied to liquids of different specific gravities, mean parts *by weight.*

A Subscriber (Manchester).—The mode of preparing unguentum hydrargyri nitratis so as to retain its proper consistence has been frequently discussed in this Journal. See vol. iv., page 450, &c. The term "Rad Variæ" in a prescription has no definite meaning. Liq. Opii Sed. signifies Battley's solution of opium. The dose of black sulphuret of antimony for an adult is gr. x. to 3ss. The term Oleum Viride is applied to oil coloured with the leaves of the elder.

Amateur de Chemie.—When dry chloride of calcium is dissolved in water, heat is developed from the combination of the water to form a hydrate. When the hydrate is dissolved cold is developed as an effect of liquefaction. We cannot occupy space with answers to the other questions.

Inquisitor.—Enquirer (near Manchester).—Bowman's *Introduction to Chemistry*, 6*s.* 6*d.*; Fownes's *Manual of Chemistry*, 12*s.* 6*d.*; Balfour's *Manual of Botany*, 12*s.* 6*d.*; Lindley's *School Botany*, 5*s.* 6*d.*; Lindley's *Elements*, 12*s.*

Mr. Forster.—We hope to be able to answer the question next month.

A Registered Apprentice (Aug. 12).—No.

A Dispenser (Lincolnshire) would have been answered by post if he had given his name and address. We cannot occupy our space by answering the same question so often.—*E. N.* (Birmingham), and *D. T.* (Regent's Park)—See the above.

A New Member.—(1.) A legally qualified surgeon and accoucheur cannot be a Member of the Pharmaceutical Society, or registered under the Pharmacy Act *while in practice.* A Member of the Society assuming the name of Surgeon and Accoucheur without being legally qualified would be a quack and an impostor.—(2.) The list will be published at such periods as may be decided on.

A Subscriber (Thornton).—We doubt whether a Chemist and Druggist having no diploma could recover payment in a county court for dental surgery.

A. R. P. S.—Persons who have passed the Major Examination and paid the fees, are registered as Pharmaceutical Chemists, and are such legally, whether in business on their own account or not, but they cannot be Members until they go into business, unless elected as superintendents.

W. L. (St. Martin's Lane).—Gum tragacanth is not wholly soluble in water.

Incognitus (Birmingham).—Rectified acid of pitch. We know it not.

M. H. P. (Peterborough).—(1.) Royle's Materia Medica.—(2.) The word indigenous applied to plants, denotes that they are natives of the country referred to.

Chemicus (Salisbury).—Pereira's *Materia Medica* is the most voluminous: price about £3 3*s.* Royle's is a good one, price 12*s.* 6*d.*

Enquirer (Trowbridge).—(1.) The change of colour of guaiacum is supposed to be caused by the absorption of oxygen.—(2.) Grain musk.—(3.) It is not necessary to attend the laboratory at Bloomsbury Square, but it is useful. When changes are made in the regulations of the Examiners, they are published. See vol. vii., No. 7.—(4.) See Beasley's Formulary.

An Associate (Bewdley).—*Isomorphous* signifies having the same form. The term is applied to those bodies which, having similar constitutions, are alike in crystalline form, or are capable of replacing each other in compounds without altering their forms. *Isomeric* signifies having the same composition. It is applied to bodies which are identical in composition but of different properties.

Juvenis (Pontefract).—The colour of aromatic confection varies slightly according to the quality and condition of the saffron. The "fine golden yellow colour" referred to is sometimes artificially heightened, a practice not worthy of imitation.

M. P. S. (Diss).—Gelatinous silica is soluble to a small extent in sulphuric acid. The vegetable substance referred to is a species of lace bark.

Ignoramus (York).—In the decomposition of unguentum hydrargyri nitrico-oxidi, the fat becomes oxidized at the expense of the oxygen of the oxide of mercury. The means of preventing it consists in not keeping the ointment long.

H. E. S. P.—Creosote is not a very definite body, and different specimens are subject to slight variations, but they are all soluble in glacial acetic acid.

A Member (Boston).—Sulphuret of barium is made by mixing sulphate of baryta with charcoal, and heating the mixture to redness for about an hour in a covered crucible. The resulting sulphuret may be dissolved from any remaining charcoal with water.

W. A. (Northampton).—The name "Liquor Potassæ Arsenitis," as applied to the Pharmacopœia preparation, is a misnomer. Phillips and Pereira were in error in supposing that the carbonate of potash is decomposed and the carbonic acid disengaged. No such result occurs. The preparation is a solution of arsenious acid in carbonate of potash, and the old name "Liquor Arsenicalis" was more appropriate than the present one.

Erratum.—Last number, page 62, line 15 from the bottom, *for* Saltzburg, *read* Salisbury.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. IV.—OCTOBER 1st, 1853.

THE RESULT OF THE SPECIAL GENERAL MEETING, AND THE PRESENT POSITION OF THE PHARMACEUTICAL SOCIETY.

The under-current which has brought on the Pharmaceutical Society the disrepute of internal disagreement, has been developed at the Special General Meeting of the Members. The nature and extent of the opposition is ascertained, the animus of the opponents has been displayed, and the Members being now in possession of the facts of the case, will be able to form their own opinion as to its merits.

It may appear strange that so much inconvenience and obstruction to business should have been occasioned by the hostility of two or three individuals, who, in their eagerness to find fault and magnify difficulties, have waived the ordinary courtesies of life, and recklessly disregarded the important objects for which the Pharmaceutical Society was founded. The assertion that they were the exponents of more than 2000 Members was never supposed to be anything short of a gross exaggeration—it is now ascertained that a stronger term would have been applicable. Even those Members who were in favour of a revision of the bye-laws, with a view to their amendment or alteration, could not support their self-styled "exponents," and offered no apology for their conduct. It was obviously the almost unanimous disposition of the meeting to uphold the principle that where opinions differ, the minority should bow to the majority. *On no other principle can the affairs of any society be conducted with harmony and order.*

The unequivocal expression of confidence in the majority of the Council, and the strong terms of reprobation with which the conduct of the opponents was animadverted upon by the meeting, may be taken as an indication of the general desire which prevails to merge minor differences on matters of detail, in the determination to maintain and secure the prosperity of the Society. The importance of speedily putting an end to this factious opposition, and shaking off the odium which disputes of this nature always entail on the parties concerned, must be obvious to every one who is sincerely desirous of promoting the elevation of the Pharmaceutists of this country to their proper position.

At no period in the progress of the Society have the duties devolving on the Council been more onerous and attended with greater difficulty, than during the completion of the arrangements for carrying the Pharmacy Act into operation, and adapting the constitution of the Chartered Society to the provisions of the Act. During nearly the whole of this time, their attention has been occupied and their time wasted in resisting the hostile attacks and determined opposition —not of avowed enemies, but of persons professing to be zealous advocates and friends of the Society. And what was the pretext for the commencement of these hostilities? It was not that the Council had swerved from or neglected their duty, lost sight of the objects of the Society, or contravened the intentions of the Pharmacy Act. It was because a doubt had arisen whether the words of the Act, according to their strict legal construction with reference to some of the details, were sufficiently explicit to carry out its objects. The Council, under competent legal advice, *claimed for the Society the benefit of the doubt,* and framed the bye-laws in such a manner as to carry out the spirit and principles of the Act and the Charter; the opponents *took advantage of the doubt as a pretext for raising a dispute,* adopted the most adverse construction of the words of the Act, and availed themselves of the utmost licence the law would admit of in opposing the bye-laws at the Home Office, and preparing for opposition elsewhere.

No doubt or dispute has arisen as to the intentions of the Act. It is simply a quibble about words. It is well known to have been intended that the fees

and terms of subscription should be regulated by the bye-laws; that fees on examination and on admission to Life Membership should prospectively be substituted for the annual subscriptions; that faith should be kept with all those who were Members or Associates at the time of the passing of the Act, and that these parties should keep faith with the Society; that the powers provided in the charter and modified in the bye-laws of 1851 for the admission of Members by other means than those described in the 10th clause of the Act, should continue in force until further modified or superseded by subsequent bye-laws; that the discretionary power of regulating the registers and other details of the management should be vested in the Council, subject to such bye-laws as might be required for carrying out the purposes of the Charter and the Act.

We allude to the intentions of the Act merely for the purpose of explaining the principles on which the Council proceeded in framing the bye-laws; but this having been done it remained to be shown whether the terms of the Act carried out these intentions—in other words, whether the Act would work. The Council were of course informed by their legal advisers that whatever might have been the intentions of those who framed the Act, all questions arising out of it must be decided according to the legal interpretation of the provisions; and on a careful consideration of these provisions, coupled with those of the Charter, the bye-laws were ultimately settled on competent legal authority in such a manner as to carry out the objects intended, and to overcome the difficulties which had caused so much perplexity.

But lawyers as well as doctors sometimes differ in opinion, and the opponents of the Council, disappointed at the non-fulfilment of their prophetic forebodings, persisted in their hostility, and succeeded in obtaining an adverse opinion from another quarter, on a case which the Council maintain to have been unfairly and incorrectly stated. This was the stalking-horse at the Home Office, and although it did not produce the effect intended, the opposition caused a delay of several weeks in the confirmation of the bye-laws, during which time the business of the Society was suspended.

This attempt to "check-mate" the Society having failed, another move was made with the same object. It was discovered (?) by the opponents of the Council that the bye-laws passed and duly confirmed in November, 1852, were illegal; that about 650 Members had been illegally elected; that the Council had no power to register the Members elected since the passing of the Act (nearly 1000 in number) as Pharmaceutical Chemists! A person who had been elected under the above bye-law, on certificate of recommendation signed by Messrs. Bastick, Dickinson, and Philpot, was induced to take up the cudgels, and in an impertinent letter to the Council (bearing the stamp of having been indited for him by a sharp lawyer), he assumed the office of Dictator, accused them of illegal practices, and ordered them to take another legal opinion for the purpose of proving themselves in the wrong. Simultaneously with the publication of this effusion, appeared the insolent attack on the President and Council, which was the subject of discussion at the Special General Meeting.

It is right that the Members should be acquainted with the rise and progress of this extraordinary attack upon the Society by two or three individuals, that they may form their own opinion as to the veracity of the assertion made by the parties concerned, that their only object was and is to benefit the Society. If the parties should succeed in obtaining a verdict to set aside the bye-laws (and the glorious uncertainty of the law justifies us in supposing such a case hypothetically) they would prove that there is a serious flaw in the Pharmacy Act; they would cause nearly 1000 Members elected since the passing of the Act to be erased from the list; they would enable all those who were Members at the time of the passing of the Act to evade the payment of their subscriptions, and oblige the Council to go to Parliament for an amended Act to enable them to carry on with efficiency and credit the affairs of the Society. With what prospect of success such an appeal to the Legislature would be made, after so disgraceful an exhibition of treachery and discord, our readers may easily imagine

We do not anticipate so triumphant a termination of this crusade against the Society, and in the event of the questions at issue being tried in a court of law we are not apprehensive as to the result. The Council will of course be prepared to defend the Society against any such attack.

The Pharmaceutical Chemists of this country have for many years claimed the privilege of self-government. They have appealed to the successful working of the Pharmaceutical Society as a proof of their capacity for this undertaking and their perseverance in carrying it out. And now, during the second year after their recognition by the Legislature, they are placed in the humiliating position of a house divided against itself, by the treacherous hostility of a few individuals who took no share in the labour of establishing the Society, and who are only known to fame as the calumniators of those whose exertions have brought it to its present position, the authors of low abuse against the President and Council, and the determined opponents of an overwhelming majority of the Members.

In the mean time the affairs of the Society require the undivided attention of the Council. The suspension of business during several weeks pending the confirmation of the bye-laws occasioned some confusion by delaying the admission of Members, the examination of candidates, and other proceedings which ought to have been completed immediately, or as soon as possible after the Annual Meeting in May. Some questions have arisen on which the Council have deemed it expedient to obtain legal advice, the result of which will, in all probability, be published next month. With this pressure of business before them, we think the Council need not allow their attention to be further distracted by the acetous fermentation of two individuals, who, after the exposure at the Special General Meeting on the 6th of last month, may safely be allowed to blush unseen, and waste their slanders on the desert air.

THE ABSURDITY OF REQUIRING PHARMACEUTICAL CHEMISTS TO KEEP THEIR PECUNIARY ENGAGEMENTS.

On the 30th of April a registered Pharmaceutical Chemist is recommended to the public as a qualified man. On the 3rd of May his qualification is taken from him—he is no longer to be trusted. And why? Because he has not paid a guinea to the Pharmaceutical Society.

On the 30th of August he is a recognized vendor of patent medicines. On the 3rd of September he is liable to a penalty of £20 for every box, bottle, or package of patent medicines which he sells. And why? Because he has not paid £2 to the Commissioners of Inland Revenue.

On the 30th of June he is qualified to keep and use a still. On the 3rd of July he is liable to a penalty for having one in his possession. And why? Because he has not paid 10*s.* 6*d.* to her Majesty's revenue.

On a certain day a lawyer is qualified to practise his profession. On the following day he is disqualified. And why? Because he has not paid £20 for his licence.

It may be said that the cases are not parallel. The money paid for licences is a tax: it goes to support the expenses of the country, and taxes are necessary.

The subscription to the Pharmaceutical Society is equally a tax. The Society is recognized by the Legislature, and is one of the institutions of the country. Its claim to such recognition is founded on the benefit which it is calculated to confer on the public in common with other public institutions which regulate the qualifications of the several classes of the community for whom they are provided. Such institutions must be supported by taxes, and whether the payment be designated by the term subscription, fee, or licence, it is to all intents and purposes a tax.

It is true that the tax payable to the Pharmaceutical Society is of small amount—so small that the grumbling which we hear on the subject is quite ludicrous—but whether small or large, if the Society is to be supported, the tax must be paid.

If the Chemists had failed in their endeavours to obtain the privilege of managing their own affairs; if the Government had undertaken the control of the Institution by means of a staff of paid commissioners, and other machinery such as governments usually provide in similar cases, a tax of several times the amount would have been required to defray the expenses.

Granting the position, which no sane man will deny, that a revenue must be raised for the support of the Society, how does this justify the principle of making the possession of a mental qualification contingent upon a money payment? What precedent is there for such an anomaly? The precedent is to be found in every institution which grants degrees and confers a professional standing upon the graduates. It is not enough that a man has passed a first-class examination at the University of London, the College of Physicians, or the College of Surgeons. He has proved his mental qualification, but before he can legally act upon it, he must pay the fees. Such fees are usually payable in one amount at the time of examination, and this will prospectively be the case with Pharmaceutical Chemists and Members of the Pharmaceutical Society. But whether in one sum or by annual instalments, the fees are equally due, the tax must be paid, and the man who would evade the payment which he knows to be due, and still retain the position which he holds conditionally upon such payment, may be a first-rate Pharmaceutist, but would not be appealed to as an authority in reference to the distinction between meum and tuum. A fellow of the Royal Society retains his fellowship subject to the payment of his annual subscription. The letters F.R.S. stamp him as a man of education and scientific attainments. He would not be less educated or scientific if he were to cease to pay his subscription; but if he were to parade his late title after having discontinued his contribution to the Society, he would be liable to be shown up as an impostor. Reverting to the point from which we started—the registered Pharmaceutical Chemist is recommended to the public on the 30th of April, not only as a person qualified to carry on his business, but as an honourable man connected with an Institution from which he derives his status as a Pharmaceutist, and to which he contributes his quota in common with his fellows. On the 3rd of May his mental capacity as a Pharmaceutist remains the same, and is not disputed, but with regard to his pecuniary engagements he is a defaulter.

Apart from the moral obligation to keep pecuniary engagements, every Member of the Society is interested in upholding the principle that the obligation to contribute towards its support is legally binding on all who sail under its colours, in spite of the quibble which has been raised on this point. The Pharmaceutical Society is a voluntary Association, and if there be any persons who desire to put their hands in the pockets of their neighbours, and to enjoy the credit of connexion with an Institution to the maintenance of which they contribute nothing, such persons ought not to be indulged in so unreasonable a demand. They are not obliged to pay the tax, but in default of such payment they have no right to expect their names to be on the register.

Even if all had passed the examination, the pecuniary obligation would be binding on all alike. This is the case in the Medical Colleges and Universities, and the fact that an annual payment is substituted for a corresponding amount payable at once, does not affect the principle.

But, with a very few exceptions, the parties on whose behalf the question has been raised have not proved their mental qualification by passing an examination. This has been taken for granted, and they have been admitted to equal rank and status with those who have submitted to the test, simply on the ground of their compliance with the terms of the Charter. A very large majority are quite satisfied with the conditions upon which they retain this rank and status. They acknowledge the justice of a mutual participation in the expenses of an Institution which they consider worthy of support. The cry of "no taxes" has been raised by a few individuals who have used all their endeavours to induce their fellow-Members to adopt views which, if acted upon, would leave the Society without the revenue necessary for carrying out its important objects.

Hitherto these endeavours have signally failed, and we have too much confidence in the common sense and good faith of the Members to suppose that they will, after having obtained for the Society the sanction of the Legislature, allow it to fail in its object for want of resources, for the supply of which they have made themselves morally if not legally responsible.

TO APPRENTICES AND STUDENTS.

In a former number (vol. xii., page 314) we offered a few suggestions to Apprentices and Students on the course which they ought to pursue in order to acquire a scientific and practical knowledge of their profession. To those who are not within reach of a school or college, but who are dependent almost entirely on their own resources and private study, these suggestions were especially addressed. But we recommend all who have the opportunity of attending lectures, or practical courses of instruction, to avail themselves of this important assistance in the prosecution of their studies.

The necessity for due attention to Pharmaceutical Education is becoming more urgent, and each succeeding year develops some fresh indication of progress in the sciences which form the groundwork of this branch of education, and which are also applicable to various other purposes, commercial, social, and intellectual. The Pharmaceutical Chemist must keep pace with the times, and the Pharmaceutical Society has a responsible duty to perform in regulating the qualifications of those who are destined to become its future Members.

The institution of an examination for Pharmaceutists was an innovation for which the Apprentices and Students were, in the first instance, unprepared. Their predecessors not having passed through this ordeal, had not inculcated on the minds of the young men under their charge the importance of making those preparations which, at the present time, are absolutely necessary. The early examinations were therefore of a very lenient character, and the Council have endeavoured to adapt the regulations to the circumstances and condition of the candidates, increasing the stringency of the examination gradually, as improved facilities for education were called forth by the demand.

The passing of the Pharmacy Act, by conferring a more stable and permanent character on the Society, and promoting the more extensive introduction of the system of education which it enjoins, furnished a ground for a revision of the regulations, with a view of making the examination more complete, and raising the qualification represented by the certificates. But the Council considered it expedient as well as just, before introducing any material alteration, to offer to candidates who should apply prior to a certain date (May 1st, 1853) a more lenient examination than that to which future applicants would be subjected. The number of candidates who placed their names on the list in accordance with this regulation, was upwards of two hundred. Although the examination referred to is lenient compared to that which will in future be instituted, it is not, as some persons have imagined, a mere matter of form. A practical knowledge of the business is required, an acquaintance with the preparations of the Pharmacopœia, and an elementary knowledge of Chemistry, Materia Medica, and Botany. Such an examination ought to be passed with facility by any young man who offers himself as a dispensing Assistant.

The Apprentices and Students whom we are now addressing, must recollect that at the time they will come up for examination the regulations will have undergone a further revision, and something more than an elementary knowledge of the scientific branches of their profession will be expected. The manner in which they occupy their time during the next three or four years, will determine the question whether they are to pass creditably, and embark in business as Pharmaceutical Chemists with a fair prospect of maintaining a good position, and enjoying the confidence of the profession and the public, or whether they are to merge in the miscellaneous class of persons, who, under the appellation of Chemists and Druggists, are not recognized as possessing any professional qualification.

CHEMICAL TRUTH.

The legitimate and proper object of Chemical researches is the establishment of the truth, and the object of Chemical evidence is professedly the same. Yet we often find experimental Chemists diverted from the right scent by their propensity to bolster up some favourite theory, and Chemical witnesses are subject to a similar frailty, from a natural tendency to lean towards the side on which they are retained.

In the legal profession the all-inspiring ambition is "a verdict." In the struggle for this prize truth is distorted, fact is so blended with fiction that it appears under false colours, justice is reduced to a mere hypothesis, and the lawyer who can obtain the acquittal of a man whom every body believes to be guilty, or nonsuit one who was supposed to be sure of a verdict, stamps himself a distinguished member of his profession, and is eagerly sought after by the public.

It is not so with the Chemist. He is not called into the witness-box as an advocate or a logician, but as an authority with reference to a plain matter of fact on which his knowledge and experience enable him to throw some light. Yet it is difficult even with this obvious line of duty before his eyes, to divest his mind of all prejudice, and avoid the appearance at least of adapting his testimony to the purpose for which his services have been called into requisition. In this he may be assisted by the counsel, who, in the examination in chief, naturally dwells on that part of the evidence which is most favourable to his case, avoiding such questions as might lead to unsatisfactory answers; and thus, unless the witness should chance to break down on cross-examination, he may without deviation from the truth, serve the party who retained him, in a case in which he might as easily have thrown the weight in the other scale if he had been retained by the opponents and questioned accordingly. But the professional character of the Chemist, is not, like that of the lawyer, concerned in the result of the trial, nor would he gain credit by purposely and ingeniously distorting his evidence so as to mislead the jury. On the contrary, if such a charge were substantiated against him he would cease to be an authority, and on a future occasion his evidence would have little weight.

It does happen, however, that the evidence of Chemists is sometimes very contradictory, and for the honour of the profession some explanation of the circumstance is desirable. It may be accounted for in part by the different meaning assignable to words according to the sense in which they are used, whether in a scientific, a practical, or commercial sense, &c., the Babel of theoretical hypothesis may lead to a mutual mystification between the witnesses, or there may be a difference of opinion among authorities in the absence of any tangible means of proof or demonstration. In the case reported at some length in our last number, in which the question hinged on the meaning of the term *coal*, five Professors of Chemistry, three Professors of Mineralogy, a Microscopist, three Geologists, and eight other witnesses practically acquainted with mining operations, swore that in their opinion a certain mineral product was not coal. Nine Professors of Chemistry, four Professors of Botany and the allied sciences, and sixteen other practical witnesses conversant with geology and mining, pronounced it to be coal. For the purposes of the trial nearly all this display of science was wasted and misplaced, as the jury were at last thrown on their own resources; in other words, they took a common-sense view of the case. The defendants took the lease of the mine with a view of obtaining gas-coal. They found a substance known in the locality by that name, answering the purpose required, in every respect what they wanted, and what they expected to find. On the same principle a quibble might be raised respecting the meaning of the term blacklead, and an action might be brought to vitiate a contract on the ground that it contained no lead. The gravamen of the contention in the coal case had no reference to the *quality* of the material, but the action arose out

of the fact that the *quantity* found exceeded the expectations of the plaintiffs. If the quantity had been inconsiderable, its identity would not have been called in question; but the large returns made it worth while to call in the aid of science to cancel a lease on the strength of a technical definition based upon chemical analysis.

A remarkable case of this kind—that of Severn *v.* The Imperial Insurance Company—is reported at length in the *Quarterly Journal of the Royal Institution* for 1821. The plaintiff was a sugar-refiner, who had insured his premises, &c., with the defendants for £70,000. The premises having been destroyed by fire, the defendants refused to make good the loss, in consequence of heated oil, circulating through a pipe in the sugar-pan, having been used for boiling the sugar; and the principal question at issue was, whether the oil, at the temperature at which it was used, emitted inflammable gases, so as to render the process dangerous. The case was tried in the Court of Common Pleas, at Guildhall, before Lord Chief Justice Dallas, who, in summing up, made the following observations:—"We have been now employed in the examination, during two days, of a great number of the most intelligent persons that this country or Europe can produce. I am myself, more or less, acquainted with all the writings of every one of these gentlemen. From this I know their information, I know their talents; and whether my time has been well or ill-employed, I will not say, but I am proud to acknowledge, that from their labours I have received at times a considerable degree of pleasure. But I must add, that these two days, thus employed, are not days of triumph, but days of humiliation, for science; for when I find that their science ends in this degree of uncertainty and doubt, and when I observe they are drawn up in martial and hostile array against each other, how is it possible for me to form, at a moment, an opinion upon such contradictory evidence? You will not, therefore, expect any opinion upon this part of the case from me; I can form none. Volumes have been spoken upon it, and I foresee, without being blessed with the spirit of prophecy, that volumes will be written upon it; and so they ought, for the elucidation of science, and the enlightening of mankind."

It has often been remarked, that on trials of this description little or no reliance is to be placed on chemical evidence, because the witnesses on each side flatly contradict those on the other, and there are, unfortunately, too many instances on record which afford a ground for the allegation, to admit of its being refuted. At the same time, the incongruity would appear much less striking if chemical evidence were taken at what it is worth, instead of being interpreted literally, without making the necessary allowance for theoretical conventionalities and the abstruse nature of the questions at issue.

We think the system now in force in trials of this nature is radically at fault. Scientific men ought not to be retained by each party and called to the witness-box under circumstances in which it is extremely difficult, if not impossible, for them to avoid feeling to some extent as partisans, and thus unconsciously deviating from that strict impartiality which ought to be maintained in questions relating to scientific truth. This liability to divergence would be removed, and the ends of justice more effectively promoted, by the appointment of a scientific commission, to whom reference should be made when chemical or other scientific evidence is required. The parties selected to investigate and give evidence upon any particular subject, not being retained on either side, and not being either directly or indirectly interested in the result, would have their minds concentrated on the facts before them, and in their evidence on chemical subjects they would be much more likely to arrive at that which is the legitimate and proper object of such evidence, namely, chemical truth.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

SPECIAL GENERAL MEETING, SEPTEMBER 6.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

In accordance with the notice published in the last number of the Transactions, this Meeting took place at the time appointed, and was numerously attended, about 140 Members being present, including six Country Members of the Council, and other Members of the Society from Nottingham, Dover, Brighton, and other places at a distance from the metropolis.

The Secretary having read the notice convening the meeting, the President introduced the subject to be considered, as follows:

The object of the meeting has been partially explained in the notice which has been read by the Secretary. Some further explanation is necessary to place the Members in possession of the facts of the case, and the position of the Council as representatives of the interests of the Society. It will be obvious from the statements about to be read, either that the Council are quite unworthy of the confidence of the Members or that the allegations are an unjust libel, which, proceeding as they do from parties holding offices in the Society, and accompanied with threats of legal hostilities and other endeavours to obstruct the proceedings of the Council, demand some notice. It should be stated, however, that the Council have no desire to suppress or restrain the free expression of opinion on the part of the Members with regard to the regulations and management of the Society. They are always glad to receive suggestions and promote discussion as a means of eliciting truth. However sincere and zealous they may be in the performance of their duty, and in promoting the interests of the Society according to their judgment, and aided, when necessary, by their legal advisers, they find it impossible to please all parties at all times, and when differences arise they use all their endeavours to adjust them speedily and amicably. When these endeavours are attended with only partial success the Council are prepared to explain and defend the course they have taken, and to receive with courtesy the animadversions of those parties with whom they have had the misfortune to differ. But they claim, in justice to themselves, that such animadversions shall be based upon fact and free from gross misrepresentation, and they consider it their duty to resist any attack which may be made avowedly with a view of injuring or subverting the Society, the interests of which they are bound to watch over. The Council are aware that for a considerable time their proceedings have been severely criticised by some of the Members, occasionally in language exhibiting no little hostility of feeling. Much as they regretted the existence of any circumstance tending to disturb the unanimity of the Members, and their inability to remove all the alleged causes of dissatisfaction, they have not hitherto deemed it necessary officially to bring under notice the hostile proceedings of the dissentients. They were desirous of putting the most favourable construction on the course adopted by those who differed with them in opinion, and were unwilling to entertain doubts as to their sincerity, until their own declarations and admissions afforded evidence of their determination, if possible, to undermine and supersede the Society. Passing over the less important statements and reflections on the character and conduct of the Council, the following observations, published by W. Bastick and W. Dickinson, in July, afford an indication of the animus and intentions of the authors:

"Let the time arrive when the Society becomes well-nigh beggared, and that time must inevitably come under the management of the now dominant faction, and the members will behold

these well-masked Pecksniffs throw off their guise. When the Society is no longer worth bleeding, these quacks will pronounce their aid useless, or pretend to be disgusted with the Society, and look out for a more profitable patient upon which to exercise their ill-requited and unappreciated skill and devotion."

Here it will be perceived the Council are charged by implication with appropriating the funds of the Society to their own private advancement. It must, however, be obvious to the mind of every person not blinded by prejudice, or something worse, that there never was a Council constituted more free from liability to such abuses. Their services are perfectly gratuitous, and from my own personal knowledge of their proceedings I am persuaded their only object is the welfare of the Institution. In another article in the same number, entitled "The Innocents in Bloomsbury Square," after some sarcastic remarks against the Council, it is stated:

"In spite of all, we may add that which we have authority for stating, namely, that should the proposed bye-laws receive the sanction of her Majesty's Secretary of State, that the question will be carried into the Court of Queen's Bench, to be there settled by the Judges according to law, which will have the good effect, at least, of showing the government and the public the nature and constitution of the Pharmaceutical Society, and will assist to pave the way for those reforms which must supersede the Pharmacy Act, and the present anomalous condition of our class, as every day makes more evident the necessity of a College of Pharmacy, governed by laws which shall operate with equal justice to every one, and be a guarantee to the public of the competency of all those that may engage in the practice of pharmacy, and by such means extinguish the drivelling pettifogging of a private society, which has been perverted to the worst of purposes."

This passage speaks for itself. In the succeeding month (August) the nature and extent of the opposition to the Society is more fully developed. The Members recently elected are informed that they are deluded, and they are advised not to take up their Membership:

"We here beg to call the particular attention of those chemists and druggists who are being admitted as members by virtue of that bye-law, to their present position. We would have them consider whether they are not deluding themselves with the notion that they will be empowered to assume the title of 'Pharmaceutical Chemists,' and that they might announce themselves as 'Members of the Pharmaceutical Society.' We would have them, above all things, before they part with their money, carefully to read the Act."

It should be remembered, that the resolution confirming and approving the bye-law referred to, was seconded by Mr. Dickinson himself. The following article requires little comment:

"It is truly pitiable to witness the mean subterfuges to which the Council of the Pharmaceutical Society resort to disguise from the members the fact, that Lord Palmerston has not confirmed the bye-laws, especially when it is worse than equivocation to assert that he has done so. We are much surprised that the President and Vice-President should attach their names to a letter, which, we will venture to say, was never written by them, but by the recognised 'artful dodger' of the Society, and which we publish elsewhere, implying that the Home Secretary has confirmed the bye-laws unreservedly and in all their integrity, when they must know, if anybody knows, that Lord Palmerston, after having been besought by the Council, on bended knees, to confer his sanction on the bye-laws, to save them from the deep humiliation of being beaten by one to twenty, has only confirmed for one year that portion of the bye-laws, against which little or nothing was urged, and left the illegal and most objectionable portion for the decision of a court of law. That this is the actual state of the case, is shown both by Mr. Waddington's letter, and by the document bearing Lord Palmerston's signature, as well as by his lordship's answer to Colonel Dunne's question in the House of Commons, all of which we publish.

"If anything were needed to prove the rottenness of the cause which the Council are so desperately advocating, we might cite the memorial signed by twenty members of that body; for it is a production that would disgrace a juvenile pickpocket, favoured with all the advantages of a ragged school education. It is manifestly an elaborate effusion of the same subtle 'artful dodger,' and we will venture to remark, that nineteen out of the twenty persons who signed it do not understand it, and that the majority have never read it, because we do not believe that a dozen members of the Society could be found, who would knowingly attach their names to such an illogical, dishonest, and contemptible document.

"To render the correctness of this criticism evident, we shall quote one or two passages of the memorial:—'The objection taken to the bye-laws by certain members of the Society, is the renewal annually of the register of those parties who have been registered as Pharmaceutical

Chemists, on the ground of their being members of the Society according to the terms of the Charter, which requires that they shall subscribe to the funds of the Society in such manner as shall be provided in the regulations thereof.' This passage shows at a glance the dishonesty of the Council in evading the real question at issue between them and the dissentient members. The chief objection taken to the bye-laws by certain members, as recorded from time to time in this journal, and fully stated at the special general meeting of the members, was the compulsory payment of an annual registration fee of one guinea, on pain of being struck off the register, and not against the annual renewal of the register. Moreover, we are sure, that if the Council desire their officer to be engaged in such a foolish occupation as the renewal of the register, that they may so employ him every month or every week, as far as the interests and principles of the dissentient members are concerned.

"To give another specimen of the glaring misstatements of the Council, we quote the next paragraph of the memorial:—'The opponents of the bye-laws desire that the register should be permanent, and that the parties so registered shall not be required in future to comply with the terms of the Charter, under which the privilege of registration was conferred upon them.' There are no less than three falsehoods in this short passage. The first we have already disposed of in commenting on the previous paragraph. The second is, that the opponents desire that the parties registered shall not be required to comply with the terms of the Charter. Now as the Charter makes no mention of a registration fee, but prescribes that the members shall contribute to the funds of the Society, the opponents of the bye-laws were not so idiotic as to object to the terms of the Charter, when there is not a syllable about a registration fee mentioned therein. The third disingenuous misstatement is, 'that the opponents desire that the parties so registered shall not be required to comply with *the terms of the Charter under which* the privilege of registration was conferred.' This passage exhibits the temerity of the parties who have put this farrago of nonsense before the world, when we consider that any child, reading the Charter, would know that the privilege of registration was not conferred under the terms of the Charter, but by the Pharmacy Act, as it was never contemplated by the authors of the Charter to found a register of Pharmaceutical Chemists; hence the obtainment of the Act and its so-called privilege of registration.

"If twenty members of the Council of a public institution can be found blind enough or obedient enough to indorse with their signatures such a document as the one now before us, we may reasonably ask, what hope is there that an institution, which was intended to supply the public with an efficient body of pharmaceutical chemists, and to protect these chemists in the exercise of their vocation, will prosper and have its legitimate functions administered with vigour and ability? There can be no hope, while all the intellect and independence of the Society lies prostrate, as far as it can be serviceable to promote its prosperity, at the feet of one man, who has been crafty enough for years to forego the honours of the presidential chair that he may the more effectually rule that chair and the Society, and have at command a post to confer, as a reward, on him who shows the most abject obedience to his will, and, consequently, the least self-respect."

The memorial alluded to was drawn up in the presence of the Council and approved by them, including the author of the article just quoted, who expressed his opinion that it was quite to the purpose, although he differed in opinion with regard to its object. In the Notices to Correspondents the following announcement occurs:

"*Henry Cripps, Devizes.*—A bill has been prepared, establishing a Royal College of Pharmacy, which will be introduced into the House of Commons next session, and will, if carried, supersede that hybrid institution in Bloomsbury Square. By the provisions of this bill every chemist of this country will be by right a fellow of the college, on the payment of a very small registration fee.

"*Ajax.*—The chief qualification, in fact the only sure one, for a professorship, or any other office, in the Pharmaceutical Society, is a period of servitude in the arch-jobber's private establishments.

"*Bosh.*—Is it likely that a committee will edite the Transactions of the Society, when the plausible Janus, who raised this delusive hope, has taken care to keep every member of the Society off the Council who would, or could, with any pretensions to ability, perform such a task?"

The September number contains the following passage:

"We should be sorry to be in the disgraceful and perilous position of the persons who have so gratuitously libelled the President and the Council of the Pharmaceutical Society, for we are certain that at the special meeting on the sixth of last (next) month that there will be such a storm of indignation at their wanton calumnies as will make the most hardened heart quail, unless the delinquents, by corrupt measures, by threats of denunciation, and by a plentiful distribution of 'Bell metal,' so plant the meeting with their hireling supporters, and so intimidate the friends of the innocent, that might and money will triumph over right, and the willingness to bear obloquy, rather than to obtain an acquittal by foul means."

You will have no difficulty in forming your opinion of such passages as these. In the course of the strictures on the proceedings of the Council, numerous personal and offensive remarks are made with regard to Mr. Bell, which it is needless to enlarge upon, as he will have the opportunity of answering for himself, but I may state my conviction that these destructive attacks on the Society and Council have originated in an ungenerous and unwarrantable jealousy of the deserved estimation in which Mr. Bell is held for his unremitting exertions and the personal and pecuniary sacrifices he has made for advancing our common interests. The Members will judge for themselves with reference to the quotations already made, whether such language is becoming and justifiable, published with the name and authority of a Member of the Council; and whether those whom they have appointed as their representatives to conduct the affairs of the Society, can act efficiently and satisfactorily when one of their number is openly endeavouring to undermine and supersede it, and assailing his colleagues in terms which are a direct impeachment of their honesty and capacity; and whether these proceedings are or are not of such a treacherous and treasonable character that if allowed to continue would endanger that honourable position they have acquired after twelve years of anxious toil and the outlay of large sums of money—in fact, they have to decide whether our course is to be progressive or retrograde.

The President then stated that he had received a considerable number of communications, expressing in strong terms the indignation and dissatisfaction of the Members at the proceedings of the authors of these attacks, and their confidence in the Council. He read the following as examples:

To the Chairman of the General Meeting of the Pharmaceutical Society of Great Britain, to be held September 6, 1853.

"Sir,—We, the undersigned Members of the Pharmaceutical Society, resident in Exeter, having heard with regret that the President, Council, and Editor of the Journal have been charged with mismanagement of the funds and business of the Society; being personally unable to attend your meeting, beg that you will express to such meeting our full confidence in the President, the majority of the Council, and the Editor of the Journal, and our unqualified approbation of their conduct and general management.

"To Mr. Jacob Bell we also feel that thanks are especially due, for his prompt and polite attention at all times to our suggestions and inquiries, whether relative to the general business of the Society, or to ourselves as individual Members.

"John Palk, *Local Secretary.*
A. W. Tanner.
John Wix.
John Chapman.
George Cooper.
Wm. Milton.
John Stone.
Thos. Dyer.
Rd. Tryer.
H. B. W. Sparshatt.
G. Pesmore.
Robert Grisick.
Holman, Ham, and Son.
Charles Bromfield.
James Freer Ash.
Thomas Knott.
Matthew Husband.
C. Brailey.
T. E. Hooker (Wellington).
S. Thornton (Exmouth).

"*Exeter, Sept.* 1, 1853."

"At a meeting of the Committee of the North British Branch of the Pharmaceutical Society, held this day, the Circular transmitted to the Members by the Secretary, in reference to a General Meeting to be held in London on the 6th instant, was taken into consideration.

"After a fair review of the whole circumstances of the case, it was resolved unanimously, "That the conduct of Mr. Dickinson as a Member of Council, and of Mr. Bastick as a Member of the Society, has been for a considerable time of so extraordinary a description, and has rendered their position in the Society of so anomalous a character, that they should be requested voluntarily to retire from it; and that in the event of their declining to do so, or on the other hand to apologise for the past, and to pledge themselves to avoid a repetition of such conduct for the future, that their expulsion has, under all the circumstances of the case, become necessary.

"Thomas Fairgrieve.
Wm. Flockhart.
John Shaw.
George Blanshard.
John J. Macfarlan, *P.*
H. C. Baildon, *V.P.*
John Mackay.
James Gardner.
James R. Young.
Henry Smith.
W. Bremner.
Willm. Aitkin.

"*Edinburgh*, 72, *Princes Street*, 1*st Sept.*, 1853."

Mr. CLARKE (of Richmond) handed the following communication to the Chairman:

"WE, the undersigned, Members of the Pharmaceutical Society, beg to express our opinion and firm conviction of the 'honesty and integrity' of the President and general body of the Council towards the good of the Society and benefit of the Members at large, and deplore the ungracious attempt of a clique of factious and impertinent individuals to disturb the harmony and injure the prospects of the Society.

"JOHN CUMBERS, Wandsworth. THOMAS M. CLARKE, Richmond.
GEORGE NIND, Wandsworth. EDM. LLOYD, Richmond.
JNO. D. WATLOCK, Wandsworth. JOHN HARWOOD, Putney.
JOHN FARMER, Putney."

The following communications are from individual Members:

To the President of the Pharmaceutical Society.

"SIR,—It being impossible for me to attend the Special General Meeting summoned for the 6th proximo, I take this mode of expressing my regret that the first year of our legalized existence should be inaugurated by unseemly squabbles amongst ourselves. It would almost appear to be a law of nature, that the members of any department of the medical profession cannot come together without, as in certain chemical combinations, producing an inconvenient evolution of caloric, and not unfrequently an explosion. To a plain Country Member there is much in your recent proceedings which is absolutely unintelligible. For example, at the General Meeting in May, continual reference was made to a certain '*Committee*,' which it appears was *self-constituted*. This was obviously absurd and irregular, and the meeting should not have recognized any Committee not appointed by themselves or their representatives. If the Members in Dundee, Abroath, or Montrose were to form themselves into a Committee to keep the London Members in order, don't you think a proceeding so closely resembling that of the celebrated three tailors of Tooley Street, would justly provoke your scornful laughter? Now, I think the one case would be not more ridiculous than the other. Again, a member of this eccentric 'Committee' is reported to have said, 'that if the fee had been fixed at *five* guineas instead of *ten*, he should have offered no opposition to it, although he maintained it would be illegal to demand even that amount.' In other words, the *degree* of illegality would vary with the *amount* of fee, so that if *one guinea* is illegal, *five guineas* would be more illegal, and *ten guineas* most illegal! Our Pharmaceutical Hampdens would do well to remember that legality is an *absolute*, not a *relative* term, and therefore an illegal tax, whether of a penny or ten guineas, is a *wrong* tax, and should not be paid. I give no opinion as to the legality of the bye-laws—the lawyers must determine that—but as to the *necessity* of an annual fee to sustain the Society, no sane man can doubt. For, if no fee, or an inadequate one, be exigible, then there can be no Pharmaceutical Society, and if there be no Society, of course the Pharmacy Bill will become a dead letter. If the Legislature had conferred such extensive powers as would have enabled the Society to force all who assumed the name of Druggist into their ranks, it would have been right and proper to raise a question as to the legality of powers so arbitrary; but when the Pharmacy Bill is merely a *means* of enabling us to raise ourselves as a professional body, I think it is highly inexpedient at the present time to raise any such question. The personal feelings which seem to have entered so largely into this misunderstanding, we at a distance can, of course, have no sympathy with. I, for one, gladly admit that the Pharmaceutists, as a body, are deeply indebted to those London Members who have so energetically and untiringly worked for the general benefit; and so long as the influence of these gentlemen, as Members, is bound up in our common efficiency and prosperity, it is unworthy and undignified to ascribe interested motives to them. At the same time, I hope these gentlemen are not so thin-skinned as to take offence at every unfair criticism; for no man in this world ever did good to his fellows without being made the object of some foul attack. I hope you will excuse the liberty I have taken. This letter, as expressing the opinion of one Member, you must estimate at its own value, and use it as you think proper.

"I am, Sir, your obedient Servant,

"*Montrose, N. B., Aug.* 29, 1853." "GEORGE BURRELL.

"DEAR SIR,—I am grieved to find by Mr. Smith's Circular of 15th instant (but only to hand this day), that the Council of the Pharmaceutical Society are so tormented by this "A Member." Living myself upwards of two hundred miles off, I fear personal attendance will be denied me, otherwise I should feel most gratified in adding my own resentment and repulsion to any and all such malicious charges as have been made the play of so reckless a class of men as have lately been exhibited towards your united body. My own recommendation would be nothing short of *expulsion*, and that in the most public manner. If all could view the Society as I do, Mr. Jacob Bell would live at the most satisfactory ease and pride in every relation he has had with the Institution. You will therefore, Sir, be pleased to take my own assurance and fullest confidence in the integrity and good intentions of your Council. Hoping you will deal with the subjects of such annoying and scandalous proceedings in a befitting manner,

"I remain, dear Sir, yours, most obediently,

"*August 25th*, 1853." "BENJAMIN MORGAN.

"*To the President of the Pharmaceutical Society.*"

"*Cirencester, August* 31, 1853.

"RESPECTED FRIEND,—I should have been much pleased to attend the Special General Meeting proposed to be held on the 6th of September, but as I shall not be able to do so, I take this means of making a few remarks on the subject to be debated. It may be supposed that I feel considerable interest in the Pharmaceutical Society, having been connected with it very nearly from its commencement, first as an Associate, and for many years as a Member. I consider that we have every reason to be satisfied with the position the Society has attained, and there can be no doubt that in a few years' time the Chemists of this country will reap the benefit of its operations. I feel implicit confidence in the President and Council of the Society, firmly believing that in all they have done their aim has been the interest of the general body of Members. The factious conduct of one or two individuals in endeavouring to cause a division amongst us is much to be deplored. In the report of the Special General Meeting, held in May, I noticed that one of this number, in his unjust remarks, declared that he acted on behalf of the Country Members. I should like to know who gave him authority so to act. As one of the Country Members I most decidedly repudiate his advocacy. The calumnious attacks made upon the character of the Editor of the Journal are very much to be condemned, as being entirely without foundation. That gentleman has been the main support of our Society, having spared neither his time or his money in advancing its interests; indeed, it must be evident to most of us that the respectable position we now occupy is almost entirely the result of his exertions, and, instead of censure, he is undoubtedly deserving of our sincere thanks.

"I remain, thine respectfully,

"*To the President of the Pharmaceutical Society.*" "ALFRED KNIGHT."

"*Canterbury, Sept. 5th,* 1853.

"SIR,—I much regret that circumstances will not allow of my attending the meeting of the Pharmaceutical Society, to be held to-morrow at Bloomsbury Square. I beg to express my unqualified approval of the course the Council have thought fit to pursue in convening the meeting, and sincerely trust that efficient means will be taken to expel any Member or Members who have proved themselves inimical to the welfare and interests of the Society.

"I remain, Sir, your obedient servant,

"J. R. HALL.

"*To the President of the Pharmaceutical Society.*"

The CHAIRMAN stated that he held in his hand nine letters of similar purport, which had been addressed to the Secretary. He and other Members of the Council had also received other letters, and was not aware of any communications of an opposite nature having been received.

In conclusion, the President expressed his regret at the necessity which had occurred for bringing a subject of that nature before the Members. He had felt it to be his duty to bring it forward. If he had been acting for himself he should have shrunk from it, but as President of the Society he felt bound to uphold its character and dignity, and to repel attacks from whatever source they might proceed. He should never shrink from the performance of a public duty on such occasions, and he hoped that the Members, in discussing the subject, would support him in his desire to promote the welfare of the Society; and at the same time avoid intemperate remarks, allow a fair hearing to all parties, and remember that, however strong their feelings might be on the subjects under discussion, they should conduct the business of the meeting like gentlemen and men of business.

Mr. DAVENPORT said he felt considerable regret in addressing the Members on that occasion, but, as a Member of the Council, he thought it right to make a few remarks. The Society had been formed to promote unanimity, to extend education, and raise the status of the Chemists. He had no personal feelings in the remarks he was about to make, but wished to do his duty and promote the interest of the Society. Could it be supposed that the conduct of Mr. Dickinson was calculated to benefit the Society? In addition to the scurrilous language against his colleagues, he had made one announcement which must be pronounced treacherous, namely, the declaration about superseding the hybrid institution in Bloomsbury Square. His conduct for a long time had greatly impeded the progress of the Society. He (Mr. Davenport) had not forgotten the first introduction of Mr. Dickinson to the Council. He had attended as one of a deputation on the subject of the Journal, and his language was so coarse and

offensive, that the other members of the deputation returned afterwards to apologise and repudiate any participation in his violent language. On another occasion he had been called to order at a General Meeting, and was obliged to apologise. He had affirmed, at a former meeting, that he was the advocate of 2000 Country Members; but no evidence had as yet been produced to show the existence of any sympathy with him in the course he was pursuing, while there was abundant evidence of an opposite character.

Mr. Fell, of Stockwell, having heard a great deal on one side, thought it was time to bring forward something on the other. An advertisement had appeared in the *Times* from the Chemists in Dover, which he should be glad to hear read.

The Chairman said the advertisement being anonymous, could not be entertained or noticed by the meeting.

Mr. Fell only wished to promote fair discussion; he thought it very important, and he feared the Council were about to take a wrong step, a more serious one than some persons seemed to think.

Mr. Bolton (of Dover) said he was responsible for the authenticity of the advertisement. Although not passed at a meeting, it was taken round to the Members in Dover, and expressed their unanimous opinion. The advertisement was then read, as follows:

PHARMACEUTICAL SOCIETY.—SPECIAL MEETING.—The Members of this Society, resident at Dover, several of whom are included among its early supporters, deeply regret that the Council should have deemed it necessary to convene a Special Meeting of the Members on Tuesday next, the 6th instant, the ultimate result of which may shake the Society to its foundation. Although no parties to the imputations which have brought about the present crisis, and with no desire to exhibit a factious spirit, they cannot divest themselves of the opinion that the present much-to-be-lamented position of the Society has been brought about by the rigid determination of the Council to enforce bye-laws, which, in their judgment, are contrary to the spirit and enactments of the Pharmacy Act, and the legality of which has been pronounced against by an eminent member of the legal profession.

With a view of saving the Society, in which they feel a deep interest, from the perils of internal dissension and litigation, they respectfully submit for the consideration of their fellow-Members, the necessity of obtaining forthwith, on behalf of the Society, the opinion of leading counsel upon the legality of the present bye-laws.

And, as a further means of removing a cause of dissatisfaction and dissension, they suggest the desirability of severing the connexion between the Society and the Pharmaceutical Journal at the end of the present year.

Dover, September 1, 1853.

Mr. Bolton thought it desirable that the advertisement should be discussed. He considered the proposal to separate the Journal from the Society a very good one, as he believed it had been the primary cause of the disagreements which had taken place. He did not defend Mr. Dickinson, and had taken no part in his proceedings.

He moved that Mr. Dickinson be called upon to explain his conduct.

Mr. Peacock seconded the resolution, thinking it unjust that any man should be condemned unheard. It was beyond all question that Mr. Dickinson was an enemy to the Society; all that he had done showed that he was inimical—nevertheless, he ought to be heard.

The resolution having been put and carried,

Mr. Dickinson said his hesitation did not arise from indisposition to come forward. He was quite ready to make remarks, but until there was a motion before the meeting, he thought it would be irregular. No charge had been brought against him. The President had come forward, and accused him of a libel against the President, Vice-President, and Council. He was prepared to substantiate every word before a proper tribunal. That was not a proper tribunal. He was told that he had tried to subvert and injure the Society! How? He had tried to serve the Society—his interest was identified with it—through its medium he hoped to benefit himself—all he had done was for its interest. He had watched its proceedings attentively from the commencement, and had not been indoctrinated by the Editor of the

Pharmaceutical Journal, as the country members were. The letters which had been read were founded on that prejudice. The President had ingeniously made it appear that he had accused the Council of appropriating the money of the Society to their own use. He had never even hinted at such a thing. He said the funds had been misapplied. People had been overpaid—money had been badly spent—large sums had been paid to the editor which never ought to have gone into his pocket. He had been taken to task for having seconded the bye-law and afterwards opposed it. He knew he had done so; but when he seconded it he believed it to be legal—he wished it to be legal; but when he found it to be illegal, a new light broke in upon him, and he acted accordingly. No man could decry him for that. If the meeting would appoint a Committee, he would explain the grounds of his opposition. The President had misrepresented what he had said about the memorial. He had seen nothing objectionable in it when he first heard it read. It was generally approved at the time by the Council. He did not see it again until some time afterwards. It was not so easy to discern blunders at first, but on sitting down to revise it, he found it open to criticism. He had been accused of personal remarks towards the editor. It was said that the editor had made sacrifices; but if he had sacrificed hundreds he had gained thousands. In all matters of business capital must be expended. Mr. Bell knew what he was about, and the return had been very lucrative. He and his colleague had some experience, and knew the advantage of a journal. His advocacy of a College of Pharmacy had been represented as hostility. People usually kept a good thing until they could get a better. It was a lame accusation to say that he was hostile on this account. He was not the party concerned in the College of Pharmacy—it was the Government. The minority had been talked about. Persons advancing new doctrines were always in a minority. Mr. Hume and other reformers were often in a minority. He had always maintained his opinions conscientiously—never offensively—never in a manner unbecoming a gentleman (considerable sensation). Being in a minority, it suited his opponents to call him impertinent and factious; but he should persevere until he had gained his point. His position was impregnable. The bye-laws were illegal. The registration fee was illegal. He intended to try the question, whether he continued in the Society, on the Council, or neither. Opinions had been taken and disregarded. What had been advanced in reply? That advice had been taken. Of whom? Mr. Tidd Pratt. Put a case properly stated to Mr. Tidd Pratt, and he would confirm Mr. Bramwell. The suggestion of the Chemists at Dover was a good one; much had been said that was irrelevant. The question before the meeting was, whether they should kick him out or not. It was quite immaterial. If they chose to make him a martyr they might do so. If any special charges had been brought against him he could have answered them; but they had simply read passages. That was not the proper tribunal. It did not represent the 4000 Members. Thousands thought as he did, but did not declare themselves. The Society was a voluntary one, but the bye-laws had made it compulsory. He was prepared to stand by every word that had appeared in his journal. The letter of the President was unworthy of him, untrue, calculated to mislead.

The PRESIDENT corrected Mr. Dickinson, and reminded the meeting that his letter was accompanied with the actual words of Lord Palmerston and his Secretary. He should not have noticed the imputation if it had not been levelled against him in his official capacity. No men of character, and having any self-respect, would hold office in the Society, if their conduct were to be misrepresented, and their integrity impeached in that manner.

Mr. DICKINSON was proceeding to comment further on his charge against the President, when the meeting, showing some impatience,

Mr. PEACOCK interposed. He desired to say one word—they had met for unity. Whether right or wrong, they ought to act as gentlemen and reasonable men.

Mr. Dickinson said he would not trespass longer on the meeting, but was prepared to support and substantiate everything at a proper tribunal.

Mr. Pedler said he came forward with some trepidation, but had a resolution to move. Mr. Dickinson called on the meeting to charge him. Were not facts sufficient? Had he not charged himself? For twelve years the Members had been at work building up a breakwater to keep out the ocean and the storm—was this to be swept away just as it was completed? He hoped the meeting would put an end to these hostile attempts to undermine the Society, by supporting the resolution he was about to move. He was disgusted with the remarks which had been read—they were worthy of the *Satirist*. Such conduct was calculated to lower the Society. Mr. Dickinson, instead of trying to repel the charges, had reiterated his offensive statements. His attacks on Mr. Bell were very unjust. The bye-laws were a mere bugbear, they had been used as a peg on which to hang an excuse for raising discord. Nothing was perfect—no laws were perfect. The House of Commons sat continually to revise and amend the laws as occasion required. He hoped the twenty Members of Council who were unanimous, would persevere, as he believed they were acting under good advice and authority. The urbanity of the Council had been tried long enough. The Members having met, ought to do their duty. After what had been read and the comments made upon it, he need add no more, but moved—

"That this meeting, having duly considered a series of offensive attacks against the President and Council, recently published in a Journal edited by William Dickinson, a Member of the Council, and William Bastick, a Member of the Board of Examiners, and having also considered the hostile course which the said William Dickinson and William Bastick have for some time past pursued towards the Society, is of opinion that such conduct is incompatible with the position and functions of a representative appointed to watch over and protect the interests of the Society, or holding a responsible office."

Mr. Clarke (of Richmond) seconded the resolution.

Mr. Fell rose to move an amendment. He thought personalities ought to be avoided; the question related to the bye-laws. He had no personal acquaintance with Mr. Dickinson or Mr. Bell. They were rival editors, which might account for personal feeling. There was a struggle between the majority and the minority. He respected the Society, but he also respected minorities—the minority were often right. In this case he thought it strange that a man should be a Pharmaceutical Chemist on the 30th of April, and recommended to the public as a qualified man, and on the 3rd of May he was not to be trusted. And why? Simply because he had not paid a guinea to the Society. The public would see the absurdity of this. It would be impolitic to discharge Mr. Dickinson from the Society, which would bring this anomaly prominently before the public.

Dr. Edwards rose to order. That was not the question. The bye-laws had been discussed and settled at a previous meeting.

The Chairman—The object of this meeting is to consider the conduct of certain parties.

Mr. Fell then moved—

"That a sub-committee be forthwith appointed to consist of non-official Members of the Society, twelve to be chosen by the Council and twelve by Mr. Dickinson; and such sub-committee shall immediately take into consideration the difference of opinion at present existing, and report the result at the earliest opportunity to a General Meeting of the Members, and that the Council be solicited to afford every information to the said sub-committee."

He was not in opposition to the Council, but thought all such differences better settled by other parties.

Mr. Burden seconded the amendment. He was not of Mr. Dickinson's party; on the contrary, he had refused to support him. He thought the meeting irregular. No charge had been brought forward except that of intemperate language. Was the Council afraid of Mr. Dickinson? He thought opposition useful and requisite; it was found to be so in the House of Commons, and great freedom of speech was allowed there. The Council were not immaculate, but open to criticism. Why had

they assembled to crush one man? Had he injured the Society? He had done nothing but fearlessly express his opinion; he had done that which many did not do, for some did nothing but support the majority—Mr. Dickinson thought for himself. It had been said that it was out of order to discuss the bye-laws. It had not been proved that Mr. Dickinson had been guilty of any offence but that of merely using intemperate language. They could not make every man a gentleman. He had been chosen by his fellow-Members to represent them, and their election was entitled to respect. He might have his admirers, though the Council did not admire him. The question which ought to be discussed was the bye-laws and the guinea qualification. A man once qualified is always qualified. The real bone of contention was the Physicians' patronage. He knew how that worked. Medical men recommended the large houses, and then a Chemist not so well off was to be cut off the ranks because he could not afford to pay the subscription. If the meeting should expel Mr. Dickinson it would be wrong and unjust. He considered him one of the best Members.

Mr. Macfarlan agreed that it was impossible to make every man a gentleman, and that this was not necessary as a qualification of membership, otherwise they might have been spared the meeting of that day. Much irrelevant matter had entered into the discussion ; but he should endeavour to keep to the point. Mr. Dickinson wished to place himself in the position of an accused party, and asked for specific charges against himself, whereas in truth it was his charges against the President and Council that had compelled them to call the meeting. It might be thought making too much of the matter to do so, and that the whole might have been treated with contempt, but the very offensive manner in which they had been attacked could not be passed unnoticed. It was not the opinions Mr. Dickinson had maintained, but his mode of pursuing the opposition, which was unconstitutional. Every man had a right to hold and to promulgate his opinions by fair and honourable means, and if he had called a meeting and delivered a lecture, or by any other legitimate step had endeavoured to convince others, no objection would have been raised. It was the tone and manner of his opposition, and the attempt to gain his point by slandering his colleagues, which obliged them to appeal to the Members. He charged the Council with obstinacy in acting in a particular way, but the Council had taken no step until they had obtained the sanction of legal authority, and they were now acting under the advice of Mr. Tidd Pratt, who had been recommended by Mr. Dickinson himself as being a gentleman in whom he had full confidence. In what way could a public body act except under legal sanction ? The Council obtained advice before taking any step, and having obtained such advice, they continued to act upon it with firmness and decision, and were not to be induced by low abuse to vacillate from the course which they thought right. Mr. Dickinson, indeed, had changed. He had on a former occasion seconded the bye-law under which they were acting. He now said that he was at that time in darkness, but he had a new light and saw his error. Under this impression he was right to change; but was he right to turn round and brand his colleagues as dishonest men because they acted concientiously on his own previous opinion, and were not sufficiently enlightened to see the propriety of changing as he had done ? When he sat down stairs in the Council-room with his colleagues taking counsel with them as friends and brethren, professedly co-operating with them for the welfare of the Society, and then wrote such paragraphs against them, and said he had written nothing offensive, what could be his notion of the meaning of the term ? He had accused the Council of conduct which, if true, would sink them very low indeed, and then he asked for charges! It was he who had brought the charges against the Council. He had accused them of being dishonest men, imbecile—in fact, traitors to the interest of the Society. It was for him to substantiate those charges, or failing to do so, he must stand forth as an unjust calumniator. He had reiterated the charges, and where was the evidence ? He accused the President of falsehood, and what was the fact? The business of the Society was suspended, all was at a stand-still, on account of the opposition to the confirmation of the bye-laws ; great inconvenience arose, and continued for some weeks; and when the Council were in a position to resume business, the President intimated the same by circular, sending along with the intimation a copy of Lord Palmerston's identical words to every Member, that all might see the precise terms of the confirmation, and yet Mr. Dickinson accused him of falsehood and misleading the Members. Could any one having any self-

respect, or feelings of a gentleman, sit at the same board with such a man? If he believed the charges which he had brought against the Council to be true, would he continue to sit with such men? with men whom he denounces as rogues and everything that is bad; and, if untrue, could he expect them to sit with him? A Member had said they were assembled to crush one man. He had crushed himself long before he came there by his own conduct. Mr. Dickinson denied that he had charged the Council with mal-appropriation of the money, but his published statements amounted to that. If it had been merely a question of paying too much, that was a matter of opinion, and one on which opinions might honestly differ. The Council were anxious to do their duty, and expend the funds of the Society judiciously. They might indeed estimate the services of a Professor more highly than Mr. D. might do, but when acting to the best of their judgment in the discharge of their duty, they were compared to pickpockets, having had a ragged school education, and plainly told that they were dishonest and imbecile. Was this fair criticism, or ought they to sit down quietly under it? The Editor of the Journal had been roughly handled by Mr. Dickinson, and accused of making a large profit by the Journal. It was well known that he had lost a great deal by it, and had also expended money in other ways for the benefit of the Society. The Chemists of this country were behind those in other countries; they are not accustomed to literary pursuits. The Journal had gone a step in advance, and contained articles practically useful. It had brought out the talent and intelligence of many Members, and had contributed greatly to elevate the character and status of the Society. To return to the charges. He, Mr. Macfarlan, had nothing to say against the Journal of Messrs. Bastick and Dickinson, so far as related to the chemical articles, which were very good, but the charges published in it and reiterated that day, must be either substantiated or negatived. The meeting must decide the question, whether Messrs. Bastick and Dickinson were right or wrong. If the meeting should decide that the conduct of these men was justifiable, he could not think of sitting again on the Council. The motion of Mr. Pedler was a very moderate one; if adopted might suffice. The Council had no wish to adopt harsh measures towards Messrs. Bastick and Dickinson. If they would apologise, express regret, and promise to avoid such conduct in future, the Council would receive them with open arms; but if, instead of that, they persevered in reiterating the scurrility, no men, having any self-respect, would willingly sit at the same board with them. He felt confident that the meeting would support the Council, but the Council would not be satisfied without a complete justification.

Mr. Herring, as an old Member of the Council, could not allow that occasion to pass without protesting againt the course of conduct which had been under discussion. Every courtesy had been shown to Mr. Dickinson, but his offensive attacks had become worse and worse. For a man to sit at a board, hear what is going on, and then publish statements contrary to fact—was such a volume of abuse to be sanctioned? If he had recanted and apologised, it might have been passed over; but no, he adhered to it.

Mr. Edwards (of Dartford) was glad that the discussion had been brought back to the real object of the meeting. He wished to impress upon the meeting the fact, that the ground of complaint against Mr. Dickinson and Mr. Bastick had no reference whatever to the opinions they entertained, but to the course they had pursued with a view of enforcing those opinions by abusive language—perfect freedom of opinion was not only tolerated but encouraged in the Council. He had entered the Council as an opposition Member under these circumstances: At an Annual Meeting several years ago he had moved an amendment against the Council, which was negatived, but instead of being treated with any coolness or discourtesy, he had, on the contrary, been courted and invited by those from whom he had differed to become a candidate at the next election, which he did, and had been on the Council ever since. He was a friend to free discussion, and was elected to say what he thought. He had always done so, and he enjoyed as much influence on that Council as any individual Member ought to possess. He respected men who spoke out boldly, and did not complain of the opposition of Mr. Dickinson, but he did complain of the ungentlemanly and offensive manner in which he behaved, and the gross language he indulged in. He would not gain his point by unjustly accusing all his colleagues of dishonesty; they would not sit on the Council to be treated in that way. If the Members thought there were any foundation for the language used against them they would willingly resign, and

leave their places to be filled by others; but they could not submit tamely to abusive charges of dishonesty and deceit, published monthly by one who sat with them at the same Council-table. The public would naturally think that as he was acquainted with all that passed, they dared not contradict him. The interests of London and Country Members were not altogether the same—the nature of their trades differed, and both classes being represented, the Council endeavoured in their regulations and proceedings to protect all alike; but when a Member of the Council began to call names, and use vulgar epithets, whatever talents he might possess were thrown away, as there were degraded people in the low alleys of London who would beat him at that.

Mr. Jacob Bell wished to correct an erroneous impression that appeared to prevail as to the object of the meeting. The question was not whether Mr. Dickinson should be expelled or not. That was out of the jurisdiction of the meeting, the power being vested in the Council. But Mr. Dickinson having been elected by the Members as one of their representatives, the Council desired to know the opinions of the Members with regard to the conduct he had pursued, and whether they still had confidence in him, for if they had, then the other Members of the Council were unfit to represent them. It was impossible for the business of the Society to proceed prosperously while the Council was so constituted. He did not mind the personal abuse against himself, and should have taken no notice of it, having been accustomed for years to rebuffs and cold shoulders. At the time the Society was established he had personally called on many Chemists, some of whom received him in a manner anything but courteous; but he made it a rule never to take offence, and when he found an opponent he spared no pains to bring about a mutual understanding, by which means many who at first were hostile had become staunch friends of the Society. In regard to Messrs. Bastick and Dickinson his efforts had totally failed. Some two or three years ago they had taken the lead in an attack upon himself in reference to the Journal, and had endeavoured to drive him from his post by discourteous personalities and imputations. Instead of taking offence at this treatment he had proposed their names as Members of the Council at the ensuing election, thinking it right that the views of their party as well as others should be represented. They had paid him off by imputing to him the offence of packing the Council, and keeping out of it every Member "who would or could with any pretension to ability perform the task" of assisting in editing the Transactions. It was impossible to conciliate them, for even if everything they asked was conceded, they were not satisfied, but started some fresh source of dispute. When the Pharmacy Act was passed, the Council endeavoured to make the best of it. As honest men they were bound to put the most favourable construction on it, and when doubts and difficulties arose, they endeavoured to surmount them. They had referred the bye-laws to Mr. Tidd Pratt at the express desire of Mr. Dickinson, who, when he found, contrary to his expectation, that the difficulties had been overcome, was dissatisfied, and had a case drawn in such a way as to extract an adverse opinion from another counsel. Every one knew that doubts might arise on any Act of Parliament, and the same question might be answered very differently, according to the manner in which the case was drawn. If the Council had submitted a case to Mr. Bramwell drawn in accordance with their own views, and even if Mr. Bramwell had modified his opinion in their favour, there was no reason to suppose that they would have been any nearer to an amicable conclusion, for it was quite clear that it was the object of Mr. Dickinson and his party to seek out and magnify difficulties, and not to surmount them. As soon as one was removed they raised up another. The Council did not, under these circumstances, feel called upon to reverse their course, while they were backed by the advice of an authority in whom they had confidence, and who had been recommended to them by their opponents. Every sincere friend of the Society must regret to see the great and important object for which it had been established, lost sight of or partially frustrated by a dispute respecting a matter of detail on which two lawyers gave opposite opinions, and whatever might be the result in the event of the question being tried in a court of law, those who were driving the Council to this extremity, could not be regarded in any other light than enemies of the Society. Mr. Fell had pointed out an anomaly in one of the bye-laws which it would have been easy to explain, if it had not been out of order to go into that subject. It might, however, be stated, that the Members of the Society who applied to Parliament for powers to carry out their object were morally, if not legally,

bound to uphold and maintain the Society, on whose behalf they asked for these powers. They had not (with a few exceptions) been admitted by examination, but were allowed to enjoy the status, in consideration of the benefit they were conferring on the public by supporting the Society. With regard to the proposal to establish a College of Pharmacy, that was no new idea. In the year 1846 he had assisted in drawing a Bill, of which he had a copy in his hand, entitled "An Act for regulating the Qualifications of Chemists and Druggists in England and Wales, and for establishing a College of Pharmacy." He had been one of a deputation to the College of Physicians on the subject, and had communicated with the then Secretary of State and several Members of Parliament. Great efforts were made to pass this Bill, but it was found to be impracticable. They were told that the term College denoted a learned body, and before they could hope to obtain the privilege, they must prove themselves qualified to exercise the powers connected with it. He had always hoped, and still hoped, that a College of Pharmacy would be established, and if they desired such a College, it was proper to consider in what manner they were most likely to obtain it—whether by the influence of a small faction, which had been described as so contemptible that it was not worth while to call a meeting of the Members to notice it, or by the influence of the Society, which had been gradually gaining strength during the last twelve years, which comprised nearly 4000 Members, and which was rising in the estimation of the profession and the public. It was by union and steady perseverance that this progress had been made, and it was only by such means that they could ultimately arrive at the desired result.

Mr. Large (of Nottingham) had been deputed by the Members in his locality to express their confidence and satisfaction in the exertions of the Council on behalf of the Members. The President of their local association would have attended, but had been unavoidably prevented by another engagement.

Mr. Collins said one fact had been elicited by the discussion, namely, that Mr. Dickinson deserved expulsion. He hoped he would not be expelled, although he deserved it. It had been said that Members of Parliament enjoyed full liberty of opposition and expression of opinion ; but in a Cabinet Council it was different. There if a member differed he did not abuse his colleagues out of doors, but retired. Mr. Dickinson had not attempted any kind of justification of his conduct except the one adopted by Shylock—

"I will not answer that, but say it is my humour."

He thought, nevertheless, that it would be better to defer any proceedings until May, and then decide it at the election. He had voted for Mr. Dickinson before, but would not do so again.

The amendment was put and negatived by a large majority, only four hands being held up in its favour.

Mr. Hooper (of Brighton) said it was the first meeting of the Society which he had attended. Behind the motion was shrouded the disposition and power of expulsion. He acknowledged the power of the Council, and the advantage of extensive powers in such cases; but this advantage only existed while the power was dormant. The harsh exercise of it was much to be deprecated. Mr. Hooper was proceeding to point out the injustice of depriving a Member who had passed the examination of his rank as a Pharmaceutical Chemist simply because he had omitted to pay the subscription to the Society, when

Mr. Bell explained that with regard to future Members this would not be the case, as they would pay a registration fee of ten guineas as Pharmaceutical Chemists and no annual subscription. The difficulty related only to the present Members, who had been admitted as annual subscribers, and who were registered as Pharmaceutical Chemists on the ground of their compliance with the terms of the Charter.

Mr. Hooper said, in that case he had no further remark to make on the subject. Mr. Dickinson had been elected a Member of Council; he could offer no apology for his conduct, which was indefensible—his language was intemperate and ungentlemanly, but he had heard harsh language on both sides. He moved an amendment, which he hoped would be carried—

"That this meeting does not sympathise with or sanction the language used in reference to the proceedings of the Council, and begs to express its confidence in the general character and conduct of their proceedings."

Mr. Collins seconded the amendment.

Mr. DAVENPORT, before the amendment was put, wished to remark, that it had been said that the feelings of those who had voted for Mr. Dickinson ought to be respected. He found by the report of the Scrutineers that 384 had voted for him. Where were these supporters to-day? How was it, that out of this number none were present to state their approval of his conduct? and that only three or four hands were held up in favour of the amendments? The fact was they could not support him, and he might add that the other Members of the Council would resign their seats if the conduct of Mr. Dickinson were sanctioned by the Members.

Mr. PEACOCK said, it had been remarked that, although Mr. Dickinson deserved it, he ought not to be expelled from the Society, on account of those who had elected him; but they had to decide between one Member of the Council and twenty. It appeared they could not pull together.

The amendment was then put and negatived, three hands being held up in its favour.

Mr. BASTICK felt called upon to make a few remarks, although he had not hitherto trespassed on the meeting. He denied the right of the meeting to try or judge Mr. Dickinson for anything contained in the *Annals*. He knew very well that the meeting was against him—that it was full of Mr. Bell's friends—he knew it was a foregone conclusion. The Council had determined to eject Mr. Dickinson. He knew why they wished to get rid of him, it was because he kept an eye on their illegal proceedings. (These and other similar expressions led to so much excitement in the meeting, that the President and others were repeatedly obliged to interfere, and request for all a patient hearing.) He knew why the meeting was not disposed to listen to him—because the question had been already prejudged in the Pharmaceutical Journal. That Journal was the most diabolical instrument that had ever been invented for the purpose of crushing individuals and keeping down rising talent. (In consequence of renewed expressions of dissent Mr. WAUGH interposed, and requested the Members to allow Mr. Bastick to proceed, observing that he would condemn himself much more out of his own mouth than they could possibly condemn him by any expressions of disapprobation.) He repeated, the Journal was a most diabolical instrument. No independent Member could promulgate his opinions. Even the students in the laboratory could not obtain the insertion of a few remarks on the School of Pharmacy in the Journal, which was falsely represented as being the organ of the Society. They were obliged to resort to an opposition journal to get their sentiments published; and the last number of the *Annals* contained an article signed "Voices from the Laboratory," which had been thus rejected by the Editor of the Pharmaceutical Journal. That meeting had no jurisdiction in the case before them. No other body possessed such power. The College of Surgeons had been attacked in the *Lancet*, in language much more violent than any which he and his colleague had used. Some of these libels were written by a member of the Council, yet no notice was taken of them, and the Council dared not expel him. He charged the Council of the Pharmaceutical Society with dishonesty. They were dishonest, because when they had the new light before them they shut their eyes to it. They would find out the difference before next November. It would be seen whether, having the light before them, they would still dishonestly shut their eyes to it, or whether they would be so imbecile as not to see it. Not two Members of the Council agreed as to the nature of the charge against Mr. Dickinson. There were no more zealous Members than Mr. Dickinson and himself. They might be expelled, but they cared nothing about it. Such a course would be contrary to public policy and opinion. Whether in the Society or out of it, they would persevere until they had gained their point. The Council might displace and injure them, but they would find that the Society would suffer much more than they should from such conduct.

Mr. CLARKE having seconded the resolution, wished to observe that he had no personal feeling against Mr. Bastick and Mr. Dickinson, but thought the best course they could adopt would be to resign the offices which they held.

Mr. BELL thought it right to add that the Council did not desire to expel Messrs. Bastick and Dickinson from the Society. He believed he was justified in making that statement as expressing the unanimous feeling of the Council. But they did desire to be released from the perplexity and annoyance of sitting at the same board with men whose conduct was such as to frustrate all their endeavours to carry on the affairs of the Society harmoniously and satisfactorily.

The resolution was then put and carried, four hands being held up against it.

Thanks having been voted to the Chairman, the meeting was dissolved.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Annual Meeting of this Association was held at the Royal Institution, Liverpool, on Friday, the 23rd of September. The following is the

REPORT OF THE COUNCIL:

Officers, 1852—53.

Council.—Mr. Sumner, *President;* Mr. Rawle, *Vice-President;* Mr. Edward Evans, *Treasurer;* Mr. Abraham, *Secretary;* Mr. Clay, Mr. Mercer, Mr. T. D. Walker, Mr. Shaw, Mr. Jardine.

Teacher of Practical Pharmacy.—Dr. Edwards.

The proceedings of the past year have comprised the Pharmaceutical meetings; at which, on August 27, 1852, Jos. Dickinson, Esq., M.D., &c., favoured the Society with an introductory lecture on Materia Medica, which, with the other proceedings, is reported in the Pharmaceutical Journal for October, 1852.

On 24th September, Mr. Mercer delivered a lecture on the Pharmacy of Gold, which has been published, with additions, in the form of a pamphlet, dedicated to the Association.

On the 29th October, Dr. J. B. Edwards delivered a lecture on Galvanic Apparatus, which is reported in the Pharmaceutical Journal for January, 1853.

On the 12th November, Mr. H. S. Evans delivered a lecture on the Pharmacy of Rhubarb, which is reported in the Pharmaceutical Journal for December, 1852. The Chemists and Druggists of the town generally were invited to this meeting for the purpose of considering the subject of the supply of medicines to emigrant ships; and a lengthened discussion took place. It was resolved that the Council be requested to send a deputation to the Emigration Commissioners, to present a memorial to them on the subject. The attention of the meeting was also called to the undue influence exercised by a Government official, in procuring orders for a relative who had commenced business as a Chemist and Druggist. This subject repeatedly engaged the attention of the Council, and they hope that the grievance was partially remedied on a complaint by Members of the Society more immediately acquainted with the circumstances.

On the 26th November, Mr. Pridham delivered a lecture on the State of Pharmacy in the United States.

On the 14th and 21st January, 1853, Mr. H. S. Evans delivered lectures on the Application of the Microscope to Pharmacy.

On the 4th February, Dr. Thomson delivered a lecture on the Diffusion of Vapour in the Atmosphere.

On the 26th February, Mr. W. Johnson, F.C.S., lectured on the Geological History of the Earth. The deputation who had waited on the Emigration Commissioners gave an account of their interview, which is reported in the Pharmaceutical Journal for March.—A vote of thanks was cordially voted to Mr. Charles Turner, M.P., for his valuable services.

On the 1st April, Mr. T. C. Archer delivered a lecture on the Crystal Palace.

On the 15th April, Mr. H. S. Evans delivered a lecture on the Character of True and Male Jalap; and presented to the Society a valuable collection of illustrative specimens. Dr. Edwards showed Collodion Daguerreotypes of microscopic objects taken by the Electric Light. Mr. Mercer illustrated various new applications of Gutta Percha.

On the 29th April, Mr. Staite lectured on the Electric Light; and exhibited the apparatus for its application at the tower, built by the Dock Committee, at the Prince's Dock. The five Societies who recommended a trial of the Light by the Dock Committee were invited to be present.

On the 3rd June, J. B. Nevins, Esq., M.D., lectured on the Higher Orders of the Animal Kingdom.

On the 24th June, Mr. Richard Manson delivered a lecture on the Geological History of the Earth.

On these occasions various other matters of interest to the Members have been discussed.

Our deputation had an interview with the Emigration Commissioners on the 17th February, and a Report of it will be found in the Pharmaceutical Journal for March. The deputation represented that if the whole of the articles required by the Commissioners to be supplied to their ships were placed before a competent examiner, provided with appropriate tests, he could readily find evidence of fraud or ignorance if such existed, and that if such evidence should not appear, the contents

of the chest might be depended on for practical purposes. It will be seen by the Report, that the deputation distinctly admitted "that it was difficult to determine by examination the exact value of some medicines, and which of two samples might be more or less pure," and that "the sophistication of some articles might be practised so as to escape detection by their examination *per se*." The Commissioners consulted Messrs. Faraday, Brande, and Ure, on the subject; and your Council were favoured by them, through Chas. Turner, Esq., M.P., with a copy of the correspondence. Notwithstanding the nature of the argument your Council made use of, the Commissioners represented to those gentlemen, under date of 4th of April, that we had asserted, "that any fairly competent medical man would be able by inspection, and by well-known tests, to ascertain the genuineness of all the medicines put on board the Commissioners' ships," and then, without a hint of the only argument which we think tenable, they proceeded to state the question they wished decided. Under such circumstances it can be no matter of surprise, that they obtained opinions adverse to your views. Your Council subsequently called their attention to the fact, that the case put by the deputation had not been submitted to those gentlemen, and that the statements of the deputation had been misrepresented, but a subsequent letter from the Commissioners intimates that they consider the question decided. We have directed the correspondence to be handed to the Editor of the Pharmaceutical Journal for publication.

During the past year a movement was made by most of the Literary and Scientific Societies of Liverpool, with a view to a more intimate mutual connexion. In pursuance of this object your officers have been invited to be present at the meetings of the Architectural and Archeological, the Polytechnic, and the Literary and Philosophical Societies; and your Council have had much pleasure in reciprocating the courtesy. The Liverpool Academy have shown similar attentions, and have sent cards for the exhibition now open. The members of the Society generally have also been invited on several occasions of interest by the Historic Society of Lancashire and Cheshire, by the Polytechnic Society, and by the Architectural Society.

Your Council have united with the other learned Societies of Liverpool in inviting the British Association to hold their Meeting next year in Liverpool, and they are gratified to find that their request has been acceded to. It will be an event of much interest, and they hope the members will contribute to the success of the meeting.

The state of the funds will be seen to be satisfactory.

The retiring members of Council are Messrs. Sumner, Rawle, and Jardine. They are eligible for re-election.

The Liverpool Chemists' Association in account with Edward Evans, Treasurer.—1853.

	£	s.	d.	£	s.	d.
Printing	9	16	0			
Mrs. Johnson, for Coffee, &c. and attendance at Lectures	6	12	2			
Mr. Turner and others, for delivery of Circulars, &c.	11	5	9			
Postages, and other miscellaneous expenses	0	14	0			
Reporting Proceedings of Pharmaceutical Meeting	1	1	0			
Advertising	0	8	3			
Rent	10	10	0			
Subscription to Cavendish Society	1	1	0			
				41	8	2
Arrears of Subscriptions, due per Six Members	.....			3	0	0
Balance in hand	.....			6	10	7
				50	18	9
Paid Botanical Lectures	.....			1	11	6
Rent of Laboratory	6	0	0			
Miscellaneous Expenses do.	1	19	0			
Paid Dr. Edwards	10	2	0			
				18	1	0
				£70	11	3

	£	s.	d.	£	s.	d.
Subscriptions per 88 Members	44	0	0			
Less Subscriptions included in 1852 account	4	0	0			
				40	0	0
Subscriptions per 13 Associates				3	5	0
				43	5	0
Balance of Cash in hand, 1852	4	1	3			
Ditto Collected for Expenses to London on Medicine Chest Business	3	12	6			
				7	13	9
				50	18	9
Botanical Lectures per Mr. Robinson	.....			1	11	6
Eight Laboratory Students, six months	16	16	0			
One Laboratory Student, three months	1	5	0			
				18	1	0
				£70	11	3
By Cash in hand, Sept. 10, 1852				6	10	7
Arrears of Subscriptions due				3	0	0

Examined and found correct, THOMAS L. WATSON, HENRY COUPLAND, *Auditors.*

CORRESPONDENCE WITH THE COLONIAL LAND AND EMIGRATION COMMISSIONERS

ON THE SUPPLY OF MEDICINES TO EMIGRANT VESSELS.

(COPY.)

"*Colonial Land and Emigration Office,*
8, *Park Street, Westminster, 15th April,* 1853.

"SIR,—With reference to the interview which took place at this office some time since between the Colonial Land and Emigration Commissioners and a deputation from the Chemists of Liverpool, accompanied by yourself, I am directed by the Board to enclose to you herewith the copy of a letter which the Commissioners addressed to Professors Brande and Faraday and to Dr. Ure, and of the answers received from the two former. The Commissioners had delayed a few days in communicating these answers to you in the hope of receiving an answer from Dr. Ure also. As, however, that gentleman's answer has not come in, and as, whatever its tenor, it could not outweigh the opinion expressed by two such eminent men as Messrs. Brande and Faraday, the Commissioners think it unnecessary longer to delay this communication.

"I need hardly state that, acting on the enclosed opinions, the Commissioners must decline to alter the terms of their charter-parties in regard to the supply of medicine chests to vessels chartered by them. The Commissioners would be much obliged to you if you would make known the grounds on which they come to this conclusion to the gentlemen who formed the deputation on the subject.

"I have the honour to be, Sir, your obedient Servant,

"*C. Turner, Esq.*" (Signed) "S. WALCOTT, *Secretary.*

(COPY.)

"*Colonial Land and Emigration Office,*
8, *Park Street, Westminster, 4th April,* 1853.

"SIR,—I am directed by the Colonial Land and Emigration Commissioners to make to you the following statement, and to express the hope of the Commissioners that you would be so good as to favour them with your opinion upon it.

"In the emigrant ships sent out by the Commissioners to the Australian Colonies complaint was repeatedly made by the Surgeons in charge that the medicines supplied for the use of the emigrants proved on trial to be of inferior quality, either by adulteration or age. In consequence of the frequency of these complaints the Commissioners determined to have the drugs required for their vessels supplied exclusively from Apothecaries' Hall; and a clause to that effect was introduced into their charter-parties. Against this regulation the Chemists of London, in the first instance, and more recently the Chemists of Liverpool, have protested, and have claimed that shipowners should be allowed absolute liberty to choose their own tradesmen, on the ground—1st, that the restriction is an imputation on their fair dealing; and, 2nd, that it is unnecessary, inasmuch as any fairly-competent medical man would be able by inspection and by well-known tests to ascertain the genuineness of all the medicines put on board the Commissioners' ships.

"I enclose a list of those medicines. The question on which the Commissioners would request to be favoured with your opinion, is, Whether a medical man of average knowledge might fairly be expected, in a rapid and compendious examination, to detect any adulteration or inferiority of quality in the drugs, so as to point out the necessity of a more rigid scrutiny—and whether such more rigid scrutiny, if it became necessary, would occupy any considerable length of time? I need not, of course, observe that as a defect in the drugs discovered after the sailing of the vessel is irremediable, and might have the most fatal consequences, the Commissioners would not feel justified in accepting anything short of the best security which under the circumstances they can obtain.

"I have the honour to be, Sir, your obedient servant

"*To M. Faraday, Esq.* (Signed) "S. WALCOTT, *Secretary.*
W. Thos. Brande, Esq.
Dr. Ure."

(COPY.)

"*Royal Institution, 6th April,* 1853.

"SIR,—I am not a medical man, and do not think that I ought to judge of the degree of facility with which a medical man of average knowledge would be able to

examine, at first rapidly and then more carefully, the many substances in the list you sent to me; but my impression is that it would be unwise to trust to examination if a simpler and surer means can be adopted of securing the possession of fit and proper medicines. The examination, to be available, should be made in every instance before the ship sails, or even before the medicines go on board the ship, and should be extended to every separate packet, or else at the time when the thing is wanted, then only is it discovered to be wrong. We see too frequently in the state of boats on board of ships, when the latter come into danger from collision or wreck; or in the state of life-saving apparatus, as lately at Aberdeen; or in the state of preserved meats sent into the Government warehouses, where examiners *are appointed* and the duty is precise, how important it is to make the state of matters *good* at the *beginning*, and to secure them so *in continuance;* and this I think will be best done in the matter of medicines, by trusting as little as may be to after examination, and by dependence in the first instance on the established character of the sources from which they are obtained. No doubt it is a ground of annoyance and complaint to an honourable and just house to be shut out from a trade where honour and justice become points of distinction. But the first, and by far the highest consideration, is the *welfare* of the *passengers* in the ships, whatever difficulty may arise in other respects, *that*, I think, ought not in the least degree to be departed from; and in the case of medicines, I think *that* will be best secured by depending on the character (established beforehand) of the sources from whence they are obtained, rather than by trusting to after examination.

"I have the honour to be, Sir, your obedient Servant,

"*To S. Walcott, Esq.*" (Signed) "M. FARADAY.

(COPY.)

Royal Mint, 6th April, 1853.

"SIR,—I have much pleasure in giving you my opinion upon the subject of your letter of the 4th instant for the information of the Colonial Land and Emigration Commissioners. It is, however, right, that you should be aware that, as Professor of Chemistry and Materia Medica to the Apothecaries' Company, I am an *ex officio* member of their Managing Committee.

"It is, I think, quite impossible that any person, however competent, should be able by the rapid and compendious examination adverted to in your letter, to pronounce upon the quality of the drugs and preparations contained in your list. In many instances the purity and genuineness of the articles can only be determined by rigid examination, and careful, and sometimes complicated testing; and in the case of many powders, tinctures, and other analogous preparations, inferior and ineffective drugs may be used without the possibility of detection.

"Besides which, unless the contractors are bound, and do adhere to certain formulæ, the actual strength and composition of many important preparations must, to a certain extent, remain matter of doubt. The articles should, without exception, be prepared according to the directions of the London Pharmacopœia, which, though often entailing difficulties and expense, attains the important object of uniform and definite composition.

"Although, therefore, in a great variety of instances, the services of an active and skilful inspector may be useful and effective, there are cases, and those important ones, and having reference to some of the most active and expensive preparations, in which no inspection, however vigilant, can insure the genuine quality of the medicines.

"I have the honour to remain, Sir, your faithful Servant,

(Signed) "WILLIAM THOS. BRANDE.

"*S. Walcott, Esq., &c. &c. &c.,*

"*Secretary to the Colonial Land and Emigration Commissioners.*"

(COPY.)

"*Liverpool Chemists' Association, Royal Institution, 16th July*, 1853.

"GENTLEMEN,—We have been favoured by Charles Turner, Esq., late Member for Liverpool, with your letter to him of the 15th April last, enclosing correspondence with Professors Brande and Faraday on the subject respecting which a deputation of our body waited on your Board on the 17th February.

"We are obliged by the courtesy you have shown to our application, and we have little to object to in the answers given by the Professors to your inquiry.

"But we beg respectfully to remind you that the case as put by us has not been submitted to those gentlemen, and we must add that if you suppose that our deputation asserted 'that any fairly competent medical man would be able by inspection and by well known tests to ascertain the genuineness of all the medicines put on board the Commissioners' ships,' they have not succeeded in making themselves understood by you.

"To satisfy you that our deputation did not adopt such an argument, and distinctly admitted a contrary statement to be the fact, we beg to hand you herewith a copy of the Pharmaceutical Journal for March, in which, at pp. 419—421, will be found a report furnished by them of their interview with you.

"We beg to recapitulate the argument on which we rely, and we shall be most glad if you will submit it to the judgment of any gentlemen eminent for their acquirements in connexion with such subjects, whose verdict would command your confidence.

"Shortly, then, we assert that if the whole of the medicines required by you to be supplied were placed before a competent examiner, provided with tests and appliances such as are in use at the emigration depôt in Liverpool, he would be able in a short time to determine whether they had been supplied by an ignorant or unprincipled person.

"And, secondly, we assert, that if no evidence of fraud or ignorance should be detected by him, the contents of the chest may be depended upon for all practical purposes.

"And, finally, we say that, if evidence of fraud or ignorance should appear in a single sample, the whole should be rejected.

"We might enlarge upon the various means of ascertaining adulterations, and remind you of the great recent improvement in the means of detecting such frauds, particularly by the application of the microscope, but we do not wish to repeat the argument we formerly laid before you, further than is absolutely necessary.

"We hope we shall not be deemed intrusive if we further suggest, that the class of scientific men who are most competent to express a valuable opinion on this subject, are the Professors of Materia Medica in the different Universities. Even Chemists, whose names are an honour to their age and country, may not be so well qualified for that purpose.

"We are, Gentlemen
(on behalf of the Liverpool Chemists' Association)
"Your obedient Servants,
"R. SUMNER, *President*,
"JOHN ABRAHAM, *Secretary*.

"*Her Majesty's Colonial Land and Emigration Commissioners.*"

"*Colonial Land and Emigration Office,*
Park Street, Westminster, 25th July, 1853.

"SIR,—I am directed by the Colonial Land and Emigration Commissioners to acknowledge the receipt of your letter of the 16th instant, stating that the case put by the Board to Professors Brande and Faraday, relative to the examination of the medicines of emigrant ships, was not that which the deputation of Liverpool Chemists desired to have put, and referring to a volume of the Pharmaceutical Journal for an exposition of the views of the deputation.

"In reply, I am to point out to you that the question which this Board alone undertook to consider, was, whether an equal protection could be afforded to the emigrants in the Commissioners' ships, allowing the medicines to be purchased at any Chemist's, and trusting to the inspection of the medical officer at the port, as by restricting the supply to the Apothecaries' Company subject to the same inspection. On this point the Commissioners, admitting their own inability to form an opinion, promised to make inquiry; and they did so, by referring the case to Professors Brande and Faraday. Those gentlemen having given a decided opinion that the restriction of the supply to 'Apothecaries' Hall' gives a substantial protection which would not exist under the unrestricted supply, the Commissioners must consider the question as decided.

"I have the honour to be, Sir, your obedient Servant,
"*To Mr. R. Sumner.*" "JOHN WALPOLE, *Assistant Secretary.*

ORIGINAL AND EXTRACTED ARTICLES.

THE CHOLERA.

The return of the Cholera to this country after a respite of nearly four years, has caused attention to be directed to the sanitary condition of densely populated districts, and active measures have been commenced by the parochial authorities in many places for the removal of the exciting causes of epidemic disease. No doubt now exists as to the influence of effluvia from drains, and the putrefaction of animal and vegetable matter in promoting the spread of the Cholera; and improved ventilation, lime whiting and cleansing rooms, a free use of water in the drains, and the removal of filth of every description from the streets and alleys, constitute the principal measures adopted by sanitary committees. Attention to diet, abstinence from spirituous liquors and other stimuli, except in very moderate quantity, and exercise in the open air, are also recommended as methods of prevention. This is a repetition of the instructions published on the previous visitation of the epidemic, and in the voluminous reports and recommendations issued by the Board of Health and other authorities the same general principles of prophylactic policy are urged as of vital importance.

With regard to medical treatment, the same doubts and differences of opinion which have always hung over this mysterious disorder, continue to prevail. Remedies recommended by one authority, are pronounced worse than useless by another, and in cases of death it is a matter of opinion whether the event should be attributed to the disease or to the treatment. Confection of opium and aromatic confection were used to a great extent in 1849, in checking the premonitory symptom of diarrhœa. In numerous instances, rhubarb, magnesia, and ginger, with oil of peppermint, followed by an opiate or astringent, produced the desired effect. But it is impossible to arrive at any data from which to infer how such cases might have terminated if they had been allowed to take their course. Enough, however, is known to justify the conclusion that an immediate attention to symptoms of diarrhœa, however slight, is of the highest importance. We quote the following remarks on this subject from one of the Reports of the Board of Health:—

With reference to those precautions against the disease which each individual may take for himself, or the heads of families or establishments for those under their charge, the first in importance are personal and household cleanliness, and the freest ventilation of living and sleeping rooms with pure air; the purity of the air we breathe being even more essential than the wholesomeness of food and drink.

When the disease has actually broken out and become epidemic in any district or locality, then the one essential precaution is not to neglect for a single hour any degree of looseness of bowels. This symptom being commonly without pain, and so slight that it is difficult to conceive that it can be of the smallest consequence, naturally leads to neglect, and this neglect has cost the lives of thousands. Were any additional proof of this required, it would be found in the events that are now occurring at Newcastle and Gateshead; all the medical men there bear testimony that premonitory diarrhœa is all but universal, and that life depends on instant attention to this symptom.

Thus, one Physician says, "He has never yet seen a case without premonitory symptoms;" another states, "He has found, in a great number of instances, where the men said they had been first seized with collapse, there had been neglected diarrhœa for twenty-four hours, or even forty-eight hours or longer;" another declares, "In all cases of collapse investigated, it is found there had been neglected diarrhœa." Even in the cases in which death takes place with the greatest rapidity, the suddenness is apparent only, not real; for the fatal collapse is the final but gradual result of diarrhœa neglected for several hours, and sometimes entire days. It must then be repeated, that in any district in which cholera is epidemic, life may depend on obtaining prompt and proper relief for painless and apparently trifling looseness of the bowels.

Mr. Richardson, of Woolwich, deprecates the use of opium and stimuli, and recommends an emetic, followed, as soon as the stomach is quieted, by a strong dose of calomel, and a rhubarb draught shortly afterwards. Mr. Grove, of Wandsworth, considers sulphur a specific in doses of about five grains, with the same quantity of carbonate of soda and half a drachm of spirit of lavender. We may expect that the medical journals will furnish a further accumulation of facts and suggestions, but whether these will tend to clear up or to increase the mystery, is very doubtful. A Committee of the Epidemiological Society is engaged in collecting and investigating information on the subject. In the mean time the public must be provided with such means as are considered most likely to be of service for warding off the disorder or relieving the early symptoms, and the parties applied to for the remedies are the Chemists, who are expected to suggest or recommend those which are most proper for the purpose. This places them in a very responsible position, for, however desirous they may be to avoid giving medical advice, they cannot on the present occasion avoid answering questions and giving such information as they possess. Under these circumstances there is one precaution which it would be wise to observe, namely, never to volunteer advice unless expressly called upon to do so; and when this is the case, to confine their recommendation to such safe and simple remedies as are comprised in the instructions of the Board of Health, or recommended on some competent medical authority.

BUSH TEA OF THE CAPE OF GOOD HOPE.

Mr. Donald Gray, of Tower Street, London, has recently had for disposal a few bags of a drug designated *Bush Tea*, imported from the Cape of Good Hope.

A sample having been submitted to Sir W. J. Hooker, it was recognized by him as the leaflets of a species of *Cyclopia*, probably *C. latifolia*, De Cand., a plant of the natural order *Leguminosæ*, native of the Cape of Good Hope.

As Mr. Gray has kindly favoured us with a specimen, we can say that it consists of small lanceolate leaves, * revolute at the margin, of coriaceous texture, bright green colour, and of an agreeably fragrant, tea-like odour.

Cyclopia genistoides, Vent., a species nearly allied to *C. latifolia*, is used under the name of *Honigthee* by the Cape colonists, who consider its infusion or decoction to possess expectorant and restorative properties. †

ON CHEMICAL SUBSTITUTES FOR THE FERMENTATION OF BREAD.

Towards the close of the last century Dr. Henry called attention to the fact that, in the fermentation of bread by means of yeast, a loss not only of sugar but of gluten is sustained, and thus a portion of the nutritive substance of the bread is sacrificed in the mechanical operation of raising the dough. He therefore recommended the employment of hydrochloric acid and bicarbonate of soda as a substitute for yeast; carbonic acid being evolved in the combination of these substances with the production of common salt, a necessary ingredient in bread. Following out this suggestion of Dr. Henry, Dr. Whiting patented in 1836 a process, which he describes as follows:—To form seven pounds of wheaten flour or meal into bread, mix from 350 to 500 grains of the carbonate of soda with about $2\frac{3}{4}$ pints of distilled water. Mix with three-quarters of a pint of water separately so much of pure muriatic acid as will neutralize the quantity of carbonate of soda that is employed, the quantity of the muriatic acid varying according to the known sp. grav. of the same. The flour must be divided into two equal portions; to one portion, which is to be put into a wide earthenware pan or trough, the solution of soda must be gradually poured in, at the same time well stirring and beating the mixture with a large wooden spoon or other

* They are actually *leaflets*, but the specimen does not *show* them as such, as they are separated from the stalks.

† Pappe, *Floræ Capensis Medicæ Prodromus*, Cape Town, 1850, p. 7.

suitable instrument, for the purpose of forming a uniform batter, free from all lumps. All pieces adhering to the sides of the pan and spoon must be scraped down into the batter before the mixing is finished. Upon this batter the other portion of the flour is then thrown, and while in the act of briskly stirring them together from the bottom, pour in gradually the diluted muriatic acid, then let the dough be formed, and while in a rough state let it be thrown on the board and lightly kneaded with a biscuit-brake or rolling-pin for a few minutes, doubling and rolling it, it becomes blended and quite uniform and light, care being taken, however, that this process is not continued too long. When this is accomplished the dough may be lightly moulded with dry flour, and baked in middling-sized loaves distinct from each other.

The oven should be hot enough to raise the dough quickly, but not so hot as to bind the crust too soon. The mixing should be conducted in a cool place, and the water used as cold as possible. Common salt should be added to flavour the bread. Great care must always be taken in mixing to secure a perfect union of the acid and alkali, otherwise the bread will be discoloured. When eggs, milk, butter, sugar, and spices are to be used in making different kinds of light cakes, the same may be mixed with one portion of the flour before the alkali is added to it, and the dough made as above described. The flour of rye and that of barley and oats, when mixed with some of wheat, may be made into bread in the same manner; if potatoes are used they must on no account exceed one-third by weight of the quantity of flour used. Rice may also be used with wheaten flour, though the best bread is generally made from wheaten flour alone.

Dr. Whiting's process does not appear to have ever been extensively used, but the subject was revived, after the lapse of a few years, by Dr. R. Thomson, who stated that, by the new system, a sack of flour gave a product of 107 loaves instead of 100 loaves, as on the old method. On the other hand, Frickinger found, by direct experiment on the large scale, that the employment of bicarbonate of soda gave an increase only of $1\frac{1}{2}$ per cent., whilst the quality of the bread was deteriorated.

In 1848 Mr. Sewell, apparently unacquainted with what had been done before, took out a patent for improvements in preparing flour, in which he uses hydrochloric acid and bicarbonate of soda.

In Mr. Sewell's process the flour is placed in a tub or circular vessel, and submitted by suitable mechanical means to the action of hydrochloric acid, which is made to fall (from a series of radial tubes having a bore of about one-hundredth of an inch) in the form of a finely divided shower, on the flour, fresh surfaces of which are constantly exposed to the falling acid. By this means about forty-five ounces avoirdupois weight of hydrochloric acid of the sp. grav. 1.14, which contains about twenty-eight per cent. of real acid, are incorporated with each 280 lbs. of flour, the mixture being afterwards sifted through a fine sieve, put into flour-barrels or other receivers, and is ready for sale. Thus a preparation of flour is produced, ready to be combined with other ingredients mentioned, which will render it suitable to be made into bread without the use of yeast. The flour thus prepared, the patentee terms the preparation No. 1, because it admits of being kept for a longer period before it is used than the preparation No. 2, which is produced as follows:—Take of good dry flour 280 lbs. avoirdupois weight, and pursue the same course of operations with it as with No. 1, up to the point at which the hydrochloric acid is thoroughly incorporated with the flour, as before described; but instead of stopping the agitation at that point, it is continued until there is sifted into and thoroughly incorporated with the mixture of flour and hydrochloric acid about thirty-nine ounces avoirdupois weight of bicarbonate of soda, in a state of fine powder, at which stage any other ingredients known to improve the appearance and flavour of bread may also be added (when such addition is thought desirable), according to the taste of the consumer. When the mixture is completed, the whole is passed through a fine sieve, put into flour-barrels or other receptacles, and is ready for sale or use.

To make preparation No. 1 into bread (which should be done within about five weeks from the time it is produced), all that is required is, to mix intimately with each pound weight to be used, sixty-three grains of bicarbonate of soda, in a state of fine powder, in which state also may be added (according to the taste of the consumer) a portion of culinary salt, sugar, or any other ingredient known to improve the appearance and flavour of bread. After the mixture is completed, it must be

kneaded well and actively with cold water; it may then be put into the oven, either immediately, or if kept cold, any time within an hour or two.

To make preparation No. 2 into bread (which should be done within four weeks from the time it is produced), all that is requisite is to knead it well and actively with cold water; it may then be put into the oven, either immediately, or if kept cold, at any time within an hour or two.

Another chemical substitute for fermented bread is the prepared flour patented by Mr. Jones, and which meets with an extensive demand at the present day.

Jones's patent flour is prepared as follows:—Take wheat or other grain, from which the flour to be prepared is made, of fine quality, perfectly dry, or make it so by passing it over a kiln. After grinding and dressing it, it should be allowed to remain to ripen for a month or six weeks; then into one cwt. of it put 10½ oz. (avoirdupois) of tartaric acid of the finest quality, and as dry as possible, and which has passed through a very fine sieve; mix it well with the flour, and pass it through a flour-dressing machine, and allow it to remain untouched for two or three days, that the water of crystallization, always more or less present in the tartaric acid, may be absorbed by the flour, and so form around the particles of acid a coating of flour that will prevent its immediate contact with the particles of alkali, and thereby prevent their mutual decomposition; afterwards mix with the quantity of flour and acid before named, twelve oz. of bicarbonate of soda in fine powder, twenty-four oz. of muriate of soda or common salt, fine and dry, and eight oz. of loaf sugar in fine powder; mix the whole thoroughly together, then put the whole mixture through a flour-dressing machine, when it will be ready for use. The quantities of acid and alkali may have to be slightly varied according to their quality, but the point to be attained is the neutralization of both. Other articles, such as bicarbonate of potassa and citric acid will make excellent bread, but are in general too expensive. The prepared flour when used to make bread, biscuits, &c., only requires to be made into dough with water, in the proportion of ten oz. of water to one lb. of flour for bread, and six oz. of water to one lb. of flour for biscuits, and to be baked at once in a well-heated oven. Carbonate of ammonia, either alone or in combination with tartaric acid, is also employed in making bread, cakes, &c., but great attention is necessary to obtain such a gradual and continuous evolution of carbonic acid gas as will prevent the bread sinking again before it is placed in the oven. A mixture of carbonate of ammonia and alum answers well, the only objection to its use arising from the alum remaining in the bread. In all cases in which ammoniacal salts are employed it is generally found difficult to expel them completely from the bread, which is thus apt to acquire a disagreeable taste.

The composition of egg or baking powder is as follows:—Carbonate of soda fifty-six lbs.; tartaric acid twenty-eight lbs.; potato-flour one cwt.; turmeric powder three-quarters of a lb.

ON DEPOSITS OF SOLUBLE OR GELATINOUS SILICA IN THE LOWER BEDS OF THE CHALK FORMATION.

BY J. THOMAS WAY, F.C.S.
Consulting Chemist to the Royal Agricultural Society of England.

The author described the discovery which, in conjunction with Mr. J. M. Paine, of Farnham, he had made of large deposits of silica in the condition in which it is readily soluble in solutions of caustic potash or soda when boiled with these solutions at ordinary temperatures in open vessels.

The beds containing this silica are geologically situate at the base of the chalk formation between the upper green sand and the gault clay. At Farnham, where the beds have been most examined, they are very fully developed, coming to the surface over a considerable breadth of land, and extending to the distance of several miles. Judging from the dip of the strata, and from such sections as the quarries in the neighbourhood afford, the author believes that the total thickness of the deposit in question cannot be at this spot less than from eighty to one hundred feet in thickness. It is not, however, of uniform character throughout, but consists of beds of yellowish, light, soft rock, intercalated with loose and apparently sandy marls.

The attention of the author was first drawn to this subject during the examination of a series of specimens representing the strata of the chalk formation, which were

collected for analysis about three years ago. On examining some of the lower deposits of this series, he was struck with the circumstance that, though of a yellowish-white colour, of small density, and having every appearance of being chalk marls (under which name they are indeed generally used in agriculture), they did not, in many cases, exhibit the smallest effervescence when treated with an acid, and contained merely a trace of lime in any form.

The following results were obtained from the analysis of a specimen of this earth:

Soluble in acids	Silica	40.30
	Peroxide of iron	2.26
	Alumina	3.44
	Lime	.61
	Magnesia	.47
	Chloride of sodium	.14
	Potash	.43
Insoluble in acids	Silica	41.23
	Alumina, with a little oxide of iron	11.12
	Traces of lime and magnesia	
		100.00

The silica "soluble in acids" is here the total quantity of silica which is soluble in potash after treatment with boiling muriatic acid in the usual way. The quantity of soluble silica directly dissolved out by potash without previous treatment with an acid, is in this case 28.70 per cent. The author observed that the existence of these beds was not altogether unknown before. Since he had been engaged upon this examination, he had found that similar deposits of soluble silica had been mentioned by Sauvage, in the *Annales des Mines*, as occurring in the Department des Ardennes, in France. Sauvage had found as much as fifty-six per cent. of soluble silica in these deposits ; and from their description it was plain that they were the same beds, although somewhat differing from the corresponding strata in England.

Within the last two years, as many as eighty or one hundred samples have been carefully collected by the author and Mr. Paine from the land of the latter at Farnham, and examined in reference to the proportion of soluble silica they contain. In all cases the quantity of soluble silica has been determined by boiling the dry and powdered earth in moderately strong solution of caustic potash or soda, which dissolves the free silica without, as is well known, affecting that portion which is combined with alumina as clay or the silica that may exist as sand.

The quantity of soluble silica so ascertained has been found to constitute from five to seventy-two per cent. of the dry earths. As a rule, the deposits which are geologically nearest the gault clay contain the smallest proportion, which increases in the beds as they rise towards the green sand. The largest proportion that has been observed hitherto has been above stated as seventy-two per cent. This particular bed is at Farnham of about ten or twelve feet of thickness, and close to the surface of the land on the hill-side. It is very remarkable when dry, on account of its extreme lightness, by which, and its porosity, it is easily recognized. Very many of the beds have been found to contain as much as sixty per cent. of free soluble silica, and twenty or thirty tons have been sent to London, affording, when ground up, an average amount of sixty-four per cent. There is therefore no doubt of the beds in question being available as a source of soluble silica if it should be found desirable so to employ them.

The author mentions that although many of the beds contain no carbonate of lime, there are others in which both soluble silica and carbonate of lime are associated. These beds are generally of a harder and more compact character, and are used locally as building-stones. The "firestone," which is quarried to a considerable extent at Godstone and Reigate, in Surrey, and used in London to form the backs of fireplaces, is from the same deposit, and of similar composition. Mr. Way has found the building-stone to contain about twenty-five per cent. of soluble silica with fifty per cent. of carbonate of lime and twenty-five per cent. of clay.

With the exception of the building and firestone rock, which are of considerable hardness, the other beds are easily reduced to powder ; indeed, when first dug up in the moist state they readily crumble between the fingers. When examined by the microscope the silica is found to be amorphous.

With the exception of a few casts of foraminæ the deposit is not infusorial.

Mr. Way proposes to employ these beds as a source of silicate of lime for agricultural purposes. He finds that the silica can be made to combine with lime with great ease in several ways : a mixture of slaked lime with the powdered rock, when made into a thin mortar, and left for several weeks, is found to be entirely converted into silicate of lime. The process is hastened by adding two or three per cent. of carbonate of soda, which becoming caustic, dissolves the silica, forming a soluble silicate, which is subsequently decomposed by the lime ; and in this way, the soda acting as a carrier between them, causes a speedy union between the silica and lime.

Another method of producing the silicate of lime, is to mix the slaked lime with the powdered rock and sufficient water to bring the mixture to the thickness of gruel, and to heat to nearly the boiling point ; the combination is complete in about an hour. In all cases the silica is used in the proportion of three equivalents to one equivalent of lime.

A mixture of the rock with chalk, when heated to low redness in a reverberatory furnace, gives the compound in a fit condition for agricultural use ; but it is necessary that the heat should be carefully regulated, otherwise the silicate becomes altogether insoluble in water.

The author has found silicate of lime produced in either of the above ways soluble to the extent of about twenty grains in the gallon of distilled water ; and as the largest portion of the twenty grains so dissolved is silica, he considers this solubility sufficient in relation to the quantity of water passing through plants, to supply all the silica required by wheat, barley, and other plants of the silicious class.

He proposes to employ the silicate of lime as a manure for light lands, and he anticipates that it will serve to correct the over-luxuriance and tendency to be "laid," which is so common in well-manured light soils, and that it will render the use of guano and other nitrogenous manures more certain and more admissible on such lands.

Mr. Way, in conclusion, suggests a possible connexion between the existence of these beds and the production of the chalk itself. He thinks it certain that the deposits of soluble silica can only have been formed from solution and in the absence of heat. Silicate of lime, derived by disintegration from the older rocks, many of which contain it in abundance and dissolved in water, may be supposed to be acted upon by carbonic acid derived from the decomposition of animal and vegetable matter or from volcanic sources. The results of such an action would be the production both of carbonate of lime and of soluble silica. The author points out as an interesting fact, that we not only find the chalk closely associated with the silica beds, but that in the case of the building and firestone before described, they are in some cases intimately mixed, which could hardly have occurred if the two deposits were not due to some common origin.—*Quarterly Journal of the Chemical Society.*

NEW METHODS FOR MANUFACTURING PURE ACETIC ACID.

The decomposition of acetate of lime or lead by means of sulphuric acid has many inconveniences, and there is danger of the product being contaminated with sulphuric acid. Christl * was therefore induced to employ hydrochloric acid as a decomposing agent, and has found that when this acid is not used in excess, the distillate contains scarcely an appreciable trace of chlorine. A mixture of 100 lbs. of raw acetate of lime obtained from the distillation of wood, and containing 90 per cent. of neutral acetate, with 120 lbs. of hydrochloric acid (20° Baumé), is allowed to stand during a night, and then distilled in a copper vessel. The application of heat requires to be gradual, in order to prevent the somewhat thick liquor from running over. The product of acetic acid amounted to 100 lbs. of 8° Baumé ; it had a faint yellow colour and empyreumatic odour, which may be perfectly removed by treatment with wood-charcoal and subsequent rectification.

In order to obtain the acetate of lime sufficiently pure, Völckel † adopts the following process :—The raw pyroligneous acid is saturated with lime without previous distillation. A part of the resinous substances dissolved in the acid are thus separated in combination with lime. The solution of impure acetate of lime is either

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* Dingler's Polytech. Journal.

† Ann. der Chem. und Pharm.

allowed to stand until it becomes clear or filtered,* then evaporated in an iron pan to about one-half, and hydrochloric acid added until a drop of the cooled liquid distinctly reddens litmus-paper. The addition of acid serves to separate great part of the resin still held in solution, which collects together in the boiling liquid, and may be skimmed off, and likewise decomposes the compounds of lime with kreosote and some other imperfectly known volatile substances, which are driven off by further evaporation. As these volatile substances have little or no action upon litmus-paper, its being reddened by the liquor is a sign that not only are the lime compounds of these substances decomposed, but also a small quantity of acetate of lime. The quantity of acid necessary for this purpose varies, and depends upon the nature of the pyroligneous acid, which is again dependent upon the quantity of water in the wood from which it is obtained. 1.50 litres of wood-liquor require from 4 to 6 lbs. of hydrochloric acid.

The solution of acetate of lime is evaporated to dryness, and a tolerably strong heat applied at last, in order to remove all volatile substances. Both operations may be performed in the same iron pans, but when the quantity of salt is large, the latter may be more advantageously effected upon cast iron plates. The drying of the salt requires very great care, for the empyreumatic substances adhere very strongly to the acetate of lime, as well as to the compound of resin and acetic acid mixed with it, and when not perfectly separated, pass over with the acetic acid in the subsequent distillation with an acid communicating to it a disagreeable odour. The drying must therefore be continued until upon cooling the acetate does not smell at all, or but very slightly. It then has a dirty brown colour. The acetic acid is obtained by distillation with hydrochloric acid in a still with a copper head and leaden condenser ; when proper precautions are taken, the acetic acid does not contain a trace of either metal. The quantity of hydrochloric acid required cannot be exactly stated, because the acetate of lime is mixed with resin, and already formed chloride of calcium. In most instances 90 or 95 parts by weight of acid, 1.16 spec. grav., are sufficient to decompose completely 100 parts of the salt, without introducing much hydrochloric acid into the distillate.

The distilled acetic acid possesses only a very faint empyreumatic odour, very different from that of the raw pyroligneous acid ; it is perfectly colourless, and should only become slightly turbid on the addition of nitrate of silver. If the acid has a yellowish colour, this is owing to resin having been spirted over in the distillation. It is therefore advisable to remove the resin which is separated on the addition of hydrochloric acid, and floats upon the surface of the liquid, either by skimming or filtration through a linen cloth. The distilled acid has a specific gravity ranging between 1.058 and 1.061, containing upwards of 40 per cent. of anhydrous acetic acid. It is rarely that acid of this strength is required ; and as the distillation is easier when the mixture is less concentrated, water may be added before or towards the end of the distillation. Völckel recommends as convenient proportions—

100 parts acetate of lime,
90 to 95 hydrochloric acid,
25 parts water,

which yield from 95 to 100 parts of acetic acid of 1.105 spec. grav. 150 litres of raw pyroligneous acid yield about 50 lbs. of acetic acid of the above specific gravity.

The acid prepared in this way may be still further purified by adding a small quantity of carbonate of soda and redistilling ; it is thus rendered quite free from chlorine, and any remaining trace of colour is likewise removed. The slight empyreumatic smell may be removed by distilling the acid with about two or three per cent. of acid chromate of potash. Oxide of manganese is less efficacious as a purifying agent.

Although pure acetic acid may be procured by the distillation of vinegar, the whole of the acid cannot be obtained except by distilling to dryness, by which means the extractive substances are burnt, and the distillate rendered impure. In order to obviate this difficulty Stein† proposes to add 30lbs. of salt to every 100lbs. of vinegar; the boiling point is thus raised, and the acid passes over completely.—*Chemical Gaz.*

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* A part is distilled off in a copper still in order to obtain wood-spirit.

† Polytech. Centralblatt, 1852, p. 395.

ON THE GENERAL DISTRIBUTION OF IODINE.

BY STEVENSON MACADAM.

(*Communicated by the Author.*)

During the last twelve months I have been engaged in a series of experimental researches as to the general distribution of iodine and bromine.

My attention was first drawn to this subject by the announcement recently made by Chatin, that he had detected the presence of iodine in the atmosphere, in rain-water, and in snow.

Believing that if iodine were present in the media referred to, its neighbour-element bromine would be found there too, I was induced to undertake the investigation, partly with the hope of being able to corroborate the results communicated by Chatin in reference to iodine, but principally with a view to determine whether an appreciable quantity of bromine was present in the atmosphere.

Several minor experiments, in the course of which I subjected to examination quantities of air ranging from 150 to 4000 cubic feet, having given a negative result so far as the detection of iodine and bromine were concerned, I at length undertook an experiment during which 100,000 cubic feet of air were transmitted through—

1st. A tube containing slips of starched paper;

2nd. A gas-bottle containing iron-filings and water; and

3rd. A similar bottle with solution of acetate of lead.

The starched papers and the liquid with iron-filings were intended to retain any *free* iodine, and the lead-solution any soluble iodide. At the conclusion of the experiment, and when 625,000 gallons of air had been passed through the arrangement, it was found that the papers were not sensibly altered in tint, and that neither the water in which the iron-filings were suspended, nor the solution of acetate of lead contained the slightest trace of iodine.

I do not purpose to take up the time of the Society by minutely detailing the several steps of the process to which the liquids obtained at this and other parts of the inquiry were subjected; suffice it to say, that in every instance when the final testing of the solution was arrived at, I determined the presence or non-presence of iodine by aid of starch, nitrate of potassa, and hydrochloric acid.

Whilst these experiments on the atmosphere were proceeding, I was examining large quantities of rain-water which had fallen in different districts of Scotland.

In some instances, acetate of lead was simply added to the water, and the whole evaporated to dryness; in other cases, iron-filings were first added, and the liquid, after being agitated with an iron rod, was treated with acetate of lead, evaporated to dryness, and subsequently tested. In no instance, even when employing twelve gallons of water at one time, was there any indication of iodine.

Twelve gallons of water obtained from snow collected in the centre of Edinburgh, also twelve gallons from snow which had fallen in the country (at Pennecuick), ten miles south of that city, and twelve gallons from the neighbourhood of Innerleithen, thirty miles south of Edinburgh, were severally treated with iron-filings and acetate of lead, and no iodine was found. The liquids ultimately obtained from the three quantities of snow-water, and which had been used in the starch-testing, were added together, neutralized with an alkali, evaporated to dryness, and carefully charred to decompose the starch; the liquid obtained from this, and which represented thirty-six gallons of snow-water, did not exhibit the slightest indication of the presence of iodine.

In these experiments I was anxious to employ reagents which were perfectly free from iodine, and therefore refrained from using the fixed alkalies to any extent, although Chatin's papers lead me to believe that they were largely employed by him. The quantity of iodine in potashes seems to decrease by each refinement, but I have never yet encountered a sample of potash in which I did not find iodine when it was sought for. The purest is that obtained by calcining the bitartrate of potash. I have had occasion several times to use small quantities of the alkali thus obtained, and although the presence of iodine could not be detected in two ounces of a strong solution, yet in six ounces a trace was visible.

The negative results of these experiments lead me to believe that in the air, in the rain-water, and in the snow employed by me, there was not an appreciable quantity of iodine.

Before parting with this part of my subject, I may state that I am well aware

that several communications have lately been laid before the Academy of Sciences which tend to verify the accuracy of Chatin's results; but one and all of them are objectionable, from the authors having employed potash and other materials, which there is every reason to believe would contain iodine originally.

Marchand employed nitrate of silver, hyposulphite of soda, and bicarbonate of potash; Grange, chloroform and caustic potash; Barral, in his late admirable researches on the atmosphere, failed to detect iodine in the rain-water which falls during January, February, March, April, and May, but found a very small quantity in that of June. I have not seen a report of the process employed by him, but think it probable that he used the materials derived from some of the nitric acid experiments, and to which he had added caustic potash in order to fix the nitric acid.

So far as regards the process adopted by myself, it is worthy of remark, that Thénard, in commenting upon the researches of Chatin, recommends that the metals most susceptible of being iodized, should be exposed for some time to the action of the air. Some months previous to this suggestion being read to the Academy of Sciences, I had used iron and lead in the search for iodine, and ten days prior to the date of Thénard's paper, a report of some of my experiments was published in the *Edinburgh Philosophical Journal*, in which the use of the metals was clearly stated.

Every trial for free iodine was accompanied by a search for bromine, but the result was, in every instance, a negative one, so far as the atmosphere, rain-water, and snow are concerned.

Whilst differing from the views expressed by Chatin in reference to the atmospheric distribution of iodine, I very willingly agree with him in considering that this element will be found more generally distributed in the vegetable kingdom than it has formerly been supposed to be. In 45 plants, hitherto unknown to contain iodine, I have discovered that element. Amongst that number, there are representatives from different districts of Scotland, and also different altitudes, from the level of the sea to some 1600 feet above it.

The determination of the presence of bromine in plants is somewhat more difficult, owing to the tests for that element being much less delicate in their action than the starch-test for iodine.

With the exception of the announcement of the presence of bromine in the ammoniacal liquids of the gas-works, in plants of the family of *Oscillariæ*, growing in thermal waters in the south of France, and a trace in carbonate of potash, I am not aware that the element in question has been shown to be a constituent of inland plants. In the greater number of plants tested by me, not a trace of bromine could be detected; but in potashes, in the ashes of the pear, the gooseberry, and apple-trees, I obtained very distinct evidence of the presence of this element. The tests I relied upon were the odour, the yellow colour imparted to ether, and the production (to a greater or less extent) of the brown-red bromide of gold.

The failures which I encountered when testing for bromine in the majority of plants, I am inclined to ascribe to the small quantity of plant ashes which were at my disposal.

In conclusion, I would state that the presence of iodine and bromine in plants, more especially in the edible ones, implies that these substances are introduced into the system of even the highest animal, and though as yet unsuccessful, yet I trust that before long I shall be able to determine the presence of both these elements as normal constituents of the animal frame.—*Quarterly Journal of the Chemical Society.*

ON THE ASSUMED PRESENCE OF IODINE IN THE ATMOSPHERE AND IN VARIOUS ANIMAL SUBSTANCES, &c.

BY DR. LOHMEYER.

Some years since Chatin instituted a number of experiments as to the distribution of iodine; he not only found this element in all spring water, fresh water, and land plants, in most diverse kinds of food, artificial beverages, wine, beer, &c., but is likewise of opinion that it is always present in the organisms both of fluviatile and terrestrial animals.

At about the same time Meyrac, Marchand, and others, proved that the distribu-

tion of iodine was much more general than had hitherto been supposed, so that its detection in the animal organism appeared less remarkable ; in fact, it may be regarded here as everywhere else in nature, a constant associate of chlorine.

But Chatin regards iodine not as an accidental but an essential constituent of the organism, and, according to his statements of the quantity present in eggs, milk, &c., he appeared to be perfectly justified in doing so. Thus, according to him, a hen's egg contains more than a litre of milk, and this again more than our ordinary food and drink. He also considered iodine of importance in the process of respiration. He states, that the normal quantity in the air is 1.5 milligrm. in 4000 litres, and that a portion of this disappears during respiration.

Fourcault, while occupying himself in the study of goitre and cretinism, examined the air in the districts where these diseases prevail; he found that the atmosphere of those places was free from iodine, and thence inferred that the absence of iodine was the principal cause of these diseases. Chatin likewise asserted that the air of the Alps is much poorer in iodine than that of Paris; he found less iodine in the valley of the Rhone than in the valley of the Seine, still less in the valley of the Isère, and a constantly diminishing quantity as he approached the Alps. After losing sight of it in his investigations on the French side of the Alps he did not meet with it again until he reached the plains of Piedmont.

Since, according to these statements, the influence of iodine upon the development and normal action of the animal organism would appear to be of very great importance, Dr. Lohmeyer has been induced to repeat the experiments of Chatin, and to submit his statements to a very careful re-examination.

Goitre does not occur in Gottingen, while in some neighbouring villages, for instance, Lengden, it is very frequent. If it were the absence of iodine in the atmosphere to which the evil is attributable, it might be expected that a sensible difference in this respect would be recognizable in the air of the two localities. Consequently, Dr. Lohmeyer examined, in the first place, the air of Gottingen. He allowed more than 4000 litres to pass in small bubbles through a solution of caustic soda, adding from time to time caustic lime to take up the absorbed carbonic acid. The apparatus was so arranged that the passage of 4000 litres of air occupied nearly a week; it might, therefore, be safely assumed that no iodine could escape absorption. Nevertheless, on testing the liquid for this element only a negative result was obtained, consequently, the examination of the air at Lengden was perfectly useless.

Dr. Lohmeyer has sought for iodine in cow's milk and hen's eggs with equally negative results. In twelve eggs previously separated from the shells, and in 600 grms. and 6700 grms. of milk no trace of iodine could be recognized. The liquids in which the iodine was to be determined amounted in all cases to only a few cubic centimetres; it was tested for by means of cold starch paste, and pure nitric acid into which nitrous acid had been previously passed.

Dr. Lohmeyer does not question the probability that iodine might be detected when much larger quantities of milk or eggs are employed, or that under certain circumstances it is present in the air, especially near factories and chemical laboratories, but he considers himself justified in concluding, from his examination of the subject, that the statements of Chatin are altogether erroneous, and that the absence of iodine in the atmosphere is in no way the cause of goitre and cretinism.—*Nachrichten v. d. Gesellsch. d. Wissench. zu Gottingen*, 1853, No. 9.

ON IODINE REACTIONS.

BY A. OVERBECK.

Chatin and Gaultier de Claubry have, as a result of their recent investigations of the accuracy of the various methods for detecting and separating iodine, given the preference to the starch-test, and recommend for the liberation of the iodine, instead of chlorine or sulphuric acid, either nitric acid or a mixture of nitric and sulphuric acids.

The author states, that from comparative experiments he has found the following process more advantageous:—

A little starch or sugar is treated with concentrated nitric acid in a test tube, and heated until a vigorous disengagement of gas commences. The gas which is then disengaged, without any further application of heat, is passed into the liquid to be

examined, which has previously been mixed with starch paste. When only one millionth part of iodide of potassium is present, the blue colour is immediately produced, and after continued application of the gas the iodide of starch separates in flocks.

By this method the author has detected iodine in the ashes of many plants, for instance, several ranuneulaceæ, *ranunculus flammula*, *Ficaria ranunculoides*, &c. . .

He likewise represents it as possessing a degree of delicacy superior to any other test, and considers that it may be more advantageous, from the circumstance that the danger to be apprehended from the presence of chloride of iodine in the nitric acid* is even less immediate than in the method adopted by Chatin.—*Archiv. der Pharmacie*, February, 1853.

METHOD FOR DETECTING THE PRESENCE OF WATER IN IODINE.

For this purpose Bolley† recommends the following process:—

About one gramme of iodine is weighed exactly in a porcelain capsule, then six or eight times the quantity of mercury added, and the whole carefully rubbed together and placed in a water-bath until there is no longer any loss of weight. The loss of weight represents the quantity of water present. The greater part of the mercury may be recovered again by pressing, and the iodide can be kept for use.

ON THE DETECTION OF SILK, WOOL, LINEN, AND COTTON FIBRES IN TEXTILE FABRICS.

BY G. C. WITTSTEIN.

Although this subject has been frequently discussed I believe the following remarks will show that a reconsideration of it was not altogether superfluous :—

I will, in the first instance, consider separately each of the above-named fibres, and their respective behaviour with re-agents, and then pass on to their section in mixed fabrics as they occur in commerce.

Silk.—The fibres of silk are thinnest of the four. Under the microscope they appear perfectly cylindric, smooth, without depressions, and only here and there at both sides is a narrow kind of rim. For the observation of these fibres a magnifying power of 160 is sufficient ; they are rendered much more distinct when moistened with water.

When the silk fibres are treated with nitric acid of 1.3 or 1.2 specific gravity, they acquire a straw yellow colour, which is not removed by washing with water. The substance of the silk suffers an alteration, the product of which is the xanthoproteic acid of Mulder. When dyed silk is treated in this way the artificial colour is generally destroyed ; but even when this is not effected completely the straw colour becomes visible after the application of a gentle heat.

Silk dipped into a solution of picric acid immediately becomes yellow, and remains so when washed with water. Apparently, therefore, the behaviour of silk to picric acid is the same as towards nitric acid, but the mode of action of these two acids is very different. The nitric acid colours the silk by converting it into a coloured substance; the picric acid on the contrary merely communicates its own colour by entering into combination with the silk fibres. As picric acid does not, like nitric acid, possess the property of destroying colours it can only be employed as a test for undyed silk.

Wool.—The fibres of wool are the thickest of the four. Under the microscope they appear perfectly cylindric, of uniform thickness, and their whole surface is covered with thin scales or epidermis cells.

With nitric and picric acids they behave in the same manner as silk.

Linen.—The flax fibres are somewhat broader than those of silk. Under the microscope they appear cylindric, with a small channel running along the centre, and presenting the appearance of a fine streak.

Nitric acid of the above strength does not produce any sensible effect upon linen, but when it is brought in contact with the fuming acid for about eight minutes,

* Böttgher has shown that all (?) strong nitric acid contains iodine in the state of chloride, and therefore considers Chatin's experiments are not trustworthy.

† Schweitzerisches Gewerbeblatt, No. 17, 1852, and Chem. Gazette.

then washed and dried, it is found to be increased one-fifth in weight, to have acquired a yellowish tinge, and may easily be torn. Ordinary ether extracts from this altered linen one-sixth of its mass; the etherial liquid leaves on evaporation a syrup which, when placed on the hand, dries up to a white chalky crust, and does not form a connected skin. The residue left undissolved by ether, when well washed, is glutinous while moist, after dying stiff and almost brittle.

A solution of picric acid communicates to linen a yellow colour, which is completely removed on washing with water.

When linen is immersed in concentrated sulphuric acid it swells up, and when allowed to remain for some time in the acid is resolved into a viscous liquid.

Linen acquires a dirty yellow appearance when boiled with concentrated caustic potash.

Cotton.—The fibres of cotton are somewhat broader than those of linen, and appear under the microscope as long thin walled cells which have collapsed in drying, and consequently form a flat ribband with rather thicker rounded edges, which may be more easily recognized where the ribband-like cells are twisted.

Nitric acid of 1.2 or 1.3 specific gravity has no sensible action upon cotton. Fuming nitric acid produces a change attended by an increase of weight amounting to at least one-half. The cotton is then almost wholly soluble in ether, and the solution (collodion) dries up to a thin membranous iridescent layer. The action of fuming nitric acid upon cotton stuffs is considerably less energetic than upon unwoven cotton. When a piece of cotton cloth is dipped into this acid for a few minutes, then washed and dried, the increase of weight does not amount to more than one-quarter; but the cloth may be torn much more easily than linen cloth treated in the same manner. Ordinary ether dissolves rather more than one-fifth its weight of the altered cotton cloth, and the solution corresponds with collodion when concentrated. The cloth which had been treated with ether and repeatedly washed, is glutinous while moist; when dry, stiff, almost brittle, with a gauze-like transparency, and as white as it was originally.

Cotton behaves like linen with a solution of picric acid.

Concentrated sulphuric acid produces the same effect upon cotton that it does upon linen, but much more rapidly, so that when both substances are brought into contact with the acid at the same moment the cotton disappears first.

Cotton, when quite clean, retains its white colour when boiled in concentrated caustic potash.

Having thus described the means of recognizing the different fibres separately, we will now inquire whether and how far they are applicable to the examination of mixed textures.

The mixtures of these four fibres which occur in commerce, are the following: silk and wool, silk and cotton, wool and cotton, linen and cotton, consequently it is only necessary to take into consideration these four.

Silk and Wool.—As both these fibres behave in the same manner towards nitric and picric acids, it is only possible to distinguish between them by means of the microscope. This is a test which is not open to any fallacy, even when the stuff is dyed.

Silk and Cotton.—Here likewise the microscope decides, although not in so marked a manner as in the former case. On the contrary, however, both nitric and picric acids afford means of distinguishing between them conveniently and well. Nitric acid is applicable in all instances, even when the stuff is dyed.

Wool and Cotton.—The microscope and nitric acid are in this case equally valuable even with coloured stuffs; picric acid, on the contrary, can only be employed in examining undyed stuffs.

Linen and Cotton.—The detection of cotton in linen stuffs is extremely difficult. Neither the behaviour with caustic potash or with sulphuric acid gives results which are exempt from doubt. The same is the case with fuming nitric acid, although it has recently been recommended by Zimmermann,* for, as was shown above, only a small portion of cotton cloth is converted by it into gun-cotton, and linen is likewise partially converted into a substance soluble in ether by the action of fuming nitric acid.

So long, therefore, as there is no other means of distinguishing between linen and

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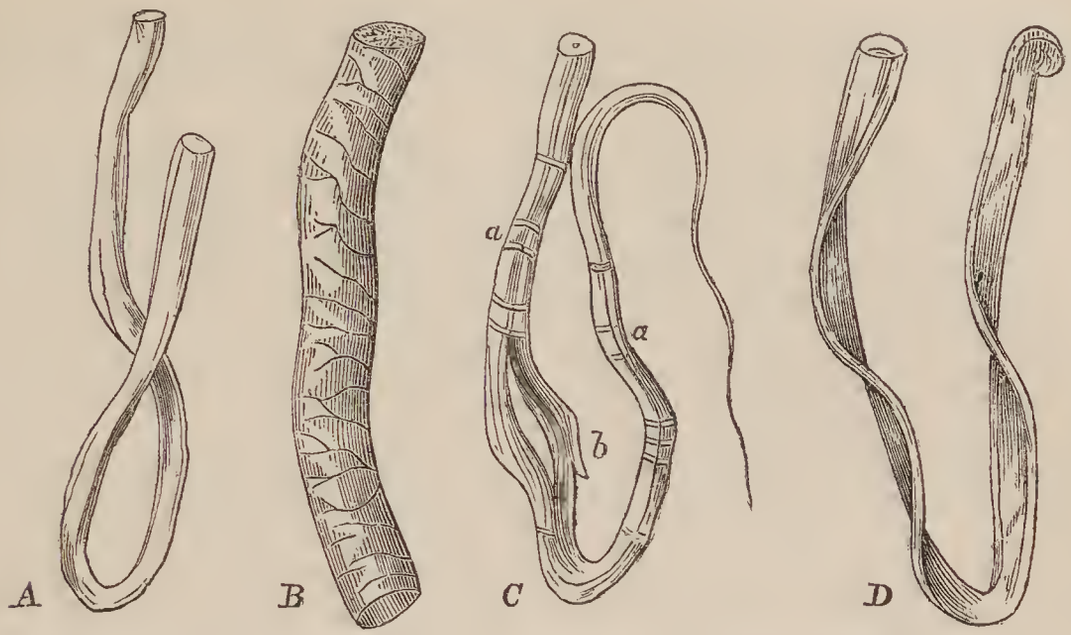
* *Archiv. der Pharmacie*, lxxii., 103.

cotton, more convenient and more certain than the microscope, at our disposal, we must avail ourselves of this in order to remove any doubt that may exist.

The accompanying plate, taken from Schleiden's *Physiology of Plants and Animals*, contains very faithful representations of these four fibres.



A is the silk fibre with the narrow membraneous fringe at several places.

B is the wool fibre with its scaly surface.

C is the linen fibre. On account of its softness it readily receives impressions, *a*, when pressed; and when violently pressed, it appears crushed, *b*, without, however, losing its coherence.

D is the cotton fibre.

ON THE EMPLOYMENT OF PICRIC ACID FOR DISTINGUISHING VEGETABLE AND ANIMAL FIBRES IN STUFFS.

BY DR. J. J. POHL.

The author employs a solution of picric acid in water or alcohol for the distinction of vegetable from animal fibre. The original watery solution is diluted with six parts, the alcoholic with 15—20 parts, of water; a small piece of the stuff to be examined is then dipped in the solution. In from six to ten minutes at ordinary temperatures, or in two or three minutes when the fluid is heated to 104° F., the stuff or yarn is taken out and washed with water. Stuffs made entirely of cotton or linen appear perfectly white after washing; but those consisting of wool, or silk, or other animal fibres, acquire a yellow colour, it being understood that undyed stuffs are to be used in the experiment. In mixed stuffs the animal fibres appear coloured, whilst the vegetable fibres remain white. The test is so exact, that even in those stuffs or yarns in which the individual threads consist of both substances, the proportion of animal and vegetable fibre can be exactly ascertained by means of a lens. By the employment of an ordinary thread counter, the number of vegetable and animal fibres in these mixed fabrics may be ascertained with sufficient exactness.

This test may also be employed with most dyed stuffs; at least it may be applied to orange, red, fawn colour, rusty yellow, violet, every kind of blue, and some browns. Thus, as the mordants usually employed, as alumina and salts of tin, and lead and iron compounds, do not produce any essential change in the yellow colour of picric acid, but only deepen it more or less, stuffs dyed with the above-named colours undergo no remarkable change by being dipped in the test-solution if they consist of vegetable fibre; but a change always takes place when animal fibre is present, and this will always indicate with perfect certainty whether a stuff consists of animal or vegetable fibre, or of a mixture of both. Thus wool dyed red becomes changed by picric acid into orange-red or orange, according to the shade of the original colour, whilst rusty yellow becomes bright yellow, blue colours green, and green greenish-yellow.—*Sitzungsb. der Akad. der Wiss. zu Wien*, ix. p. 387.

EXAMINATION OF A MINERAL CONTAINING BORATE OF SODA AND BORATE OF LIME.

BY M. L. R. LECANU.

One of the principal merchants of Paris, M. Charles Camus, my brother-in-law, has recently received from America a substance which appears from the information furnished by his agent to exist in considerable quantities in Iqueque, in the republic of Equator.

This substance is in rounded masses, the largest being of the size of a walnut and of the weight of fifteen grammes, and the smallest of the size of a filbert and weighing about three grammes. The masses are covered with a reddish powder, which is dull, rough to the touch, and amorphous. The interior of the masses is perfectly white, of a pearly lustre, soft to the touch, and presenting under the microscope a multitude of remarkably regular four-sided prisms.

At 212° F. they give off water, and at a red heat they give off a further portion of water, but without blackening, and without disengaging any odorous vapours, or anything capable of reacting on test-paper.

Boiling water, without dissolving the whole, takes up chloride, sulphate and borate of soda, borate of lime, and traces of magnesia; and the product of the evaporation to dryness of this solution, treated with boiling spirit of sp. gr. .940, yields the chloride, the sulphate and borate of soda, without any trace of lime or magnesia. This is an easy method of separating the salts of soda which it contains from those of lime and magnesia.

It is composed, in 100 parts, of

	First Analysis.	Second Analysis.	Third Analysis.
Water, removable at 212° F.	15.	16.60	32.86
Ditto, removable at above 212° F.	15.	18.00	
Earthy matter—sand, phosphate of lime, alumina, and oxide of iron	12.	10.70	9.26
Chloride of sodium	36.	9.87	9.60
Sulphate of soda		5.04	6.28
Borate of soda		13.44	19.00
Borate of lime	22.	26.35	23.00
Borate of magnesia	traces.	traces.	traces.
	100.	100.	100.

In determining the proportions of the constituent parts of the mineral, I took two equal quantities of it. One of these was first heated to 212°, and afterwards to redness, in order to ascertain the weight of the water present. The other portion was treated, in the first place, with boiling spirit, of sp. gr. .940, until it became alkaline; and, in the second place, with boiling distilled water, as long as anything was dissolved that afforded a precipitate with oxalate of ammonia or nitrate of silver, the insoluble residue containing only earthy matter.

The evaporation to dryness of the aqueous solution gave the sum of the borates of the earths; that of the alcoholic solution, the sum of the salts of soda.

This being done, the salts of soda were dissolved in distilled water, the solution strongly acidulated with nitric acid, and divided into two parts. To one of these nitrate of baryta was added, and from the precipitated sulphate of baryta the sulphate of soda originally present was calculated. To the other was added nitrate of silver, and the chloride of sodium calculated from the precipitated chloride of silver. The difference between the sum of these and the mixed salts previous to solution, was estimated as borate of soda.

It need hardly be stated, that, by means of sulphuric acid, the boracic acid is separated from the alkaline and also from the earthy borates, and that this is known by its fusibility, the lamellar form of its crystals, and its imparting to alcohol the property of burning with a green flame.

The brilliant and satiny appearance of the prismatic crystals of the mineral are due to the borate of lime. This is proved by the fact that they remain unaltered in

the portion which weak spirit does not dissolve, while they disappear after the treatment with water. They may also be isolated and freed from the other salts with which they are associated in the mineral, by macerating the central portion of one of the masses in cold water.

This borate, in a state of purity, such as it is obtained in by concentrating the boiling aqueous solution until a pellicle is formed, and then collecting on a filter the micacious scales which separate as the liquid diminishes, and washing these with cold water, is completely insoluble either in concentrated or weak alcohol; it is very little soluble in cold water, although oxalate of ammonia and nitrate of silver indicate its presence; it is very sensibly soluble in boiling water, and separates on the cooling of the solution in brilliant and satiny plates.

The aqueous solution possesses an alkaline reaction; is not rendered turbid by nitrate of baryta; and forms, with nitrate of silver, a precipitate which immediately dissolves in nitric acid and in ammonia. This precipitate, however, instead of being white, like that produced with common borate of soda, is of an olive colour. This singular result is due to the following fact, for which I am indebted to my friend M. Jules Bonïs:—Solutions of the borates of the alkalies produce with nitrate of silver white precipitates of borate of silver when the solutions are concentrated, and brown precipitates of oxide of silver when the solutions are very dilute. In the latter case the boracic acid resulting from the decomposed borate remains in the solution in the free state.

The native borate under notice, after being dried over a water-bath, retains, like hydrated sulphate of lime, twenty-nine per cent. of water, which it only loses at a higher temperature.

The proportions of the acid and the base are those of neutral borate of lime, which are known to be—

Acid	71.3
Base	28.7
	100.0

In fact, one gramme of the borate, dissolved in water, and precipitated with oxalate of ammonia, gave, after the calcination of the precipitate and the transformation of the residue into sulphate, 0.70 gramme of sulphate of lime, equal to 29.40 parts of lime in 100 parts of borate; and three grammes of the borate, dissolved in hot water and treated with sulphuric acid, gave, after being evaporated to dryness and exhausted with boiling alcohol, 2.10 grammes of sulphate of lime, representing 0.88 grammes of lime, and equal to 29.34 parts of lime in 100 parts of borate.

The absence of silicate of lime distinguishes this borate of lime from the borosilicate of lime which is designated by mineralogists by the names *datholite*, *botryolite*, and *esmarkite*.

On the other hand, it is distinguished by its physical condition from the pulverulent borate of lime, noticed by M. Beudant in some rare localities in Germany. It may, I think, be considered a particular mineralogical variety, *a crystallized hydrated borate of lime*, having the formula $CaO\ BO_6 + Aq$.—*Journal de Pharmacie.*

ON THE EXAMINATION OF FAT OILS BY MEANS OF SULPHURIC ACID.

BY H. FEHLING.

Maumené has communicated the results of experiments made by him on the behaviour of different fat oils with concentrated sulphuric acid, and proposed its application to detect adulteration.* Induced, from the technical importance of the subject and the slight value of previous methods, Professor Fehling has suggested a closer examination of it, which has been undertaken by MM. Faisst and Knauss.

They have found, that upon the whole the statement of Maumené is correct, but have ascertained at the same time that uniform results can only be obtained under perfectly similar conditions; that the degree of temperature produced essentially depends upon the rapidity with which the acid and oil are mixed, upon the strength and quantity of acid, the temperature of the liquids before mixing the quantities employed, and the capacity and substance of the glass vessel. Differences in these

* Pharmaceutical Journal, vol. xii., p. 497.

circumstances were found sufficient to cause a variation in the temperature, amounting to as much as 10° F., consequently the external conditions of the experiment must always be similar. Even when the greatest care is exercised in this respect, the results of a number of experiments may vary one or two degrees, so that it is necessary always to take the mean of four or more determinations.

The acid employed was obtained by distilling sulphuric acid until the residue had attained the highest degree of concentration.

Linseed oil is the only one which does not admit of the use of strong acid, as the temperature of the mixture rises above 212° F., and in consequence of unavoidable decomposition, accompanied by a large evolution of sulphurous acid, the increase of temperature varies from 50° to 59°. The acid used for linseed oil was therefore such as contained ninety per cent. of monohydrated acid.

In each experiment fifteen grms. of oil were taken; it is probably more advantageous to take fifty grms. as Maumené recommends, since in that case the results vary less.

The oils examined were olive, poppy, almond, rape, and linseed oils. The olive oil was bought, the poppy oil was carefully prepared from fresh seeds, as were also the linseed, rape, and almond oils. The Lucca oil, as it occurs in commerce in Germany, is an olive oil with a small and variable amount of turpentine, which may account for the results varying.

In every experiment the oil and acid were mixed when at the ordinary temperature; the oil was weighed in a small beaker glass, and the sulphuric acid weighed into it from a burette, the whole stirred quickly with a thermometer, and the temperature read off. The beaker glasses used were as uniform as possible.

The following are the results of the experiments made with different oils:

Olive Oil.—15 grms. of oil was mixed with 5 grms. of monohydrated sulphuric acid; the temperature rose from 61° F. to 128° or 131° F., about 67° or 70°. The mean elevation of temperature in six experiments was 68.5°.

Lucca Oil.—The same proportion of oil and acid gave on mixing an elevation of temperature from 56° to 128° or 130° F. The mean result of four experiments was 72.5.

Almond Oil gave an elevation of temperature from 55° to 137° or 140° F.

Rape Oil gave an elevation of temperature from 57° to 155° or 159° F. The mean result of six experiments was 100°.

Poppy Oil gave an elevation of temperature from 64° to 189° or 193° F. The mean result of six experiments was 127°.

Linseed Oil.—15 grms. of oil mixed with 7½ grms. of acid containing 90 per cent., gave an elevation of temperature from 61° to 194° or 198° F. The mean result of six experiments was 133°.

Rape Oil.—Mixed with the same acid as the last oil, and in the same proportion, it gave an elevation of temperature from 63° to 128° or 132° F. The mean result of four experiments was 67°.

Lucca Oil treated in the same way gave an elevation of temperature from 54° to 106° or 109°, about 52° or 55°. The mean result of four experiments was 54°.

The increase of temperature for the several may therefore be adopted as follows:

Olive oil with pure sulphuric acid	68 degrees
Lucca oil	72.5 "
Almond oil	72.5 "
Rape oil	100 "
Poppy oil	127 "
Lucca oil with acid of 90 per cent.	54 "
Rape oil	67 "
Linseed oil	133 "

After these determinations it appeared important to make experiments with mixtures of different oils.

Mixtures of Olive Oil with Poppy Oil.

1. 15 grms. of oil, containing 10 per cent. of poppy oil. Temperature rose from 58° to 130° or 133°, increase of temperature 72° to 75°. Mean result of five experiments 73°.

2. 15 grms. of oil, containing 20 per cent. of poppy oil. Mean result of six experiments 79°.

3. 15. grms. of oil, containing 50 per cent. of poppy oil, mean result of four experiments 97°.

4. 15 grms. of oil, containing 80 per cent. of poppy oil, mean result of five experiments 115°.

It follows from these results that the elevation of temperature bears a regular proportion to the per centage of poppy oil, the differences not being greater than those between the individual experiments.

Mixtures of Linseed Oil with Rape Oil.

1. 15 grms. of oil containing 5 per cent. of rape oil with acid of 90 per cent. Mean result of five experiments 131°.

2. 15 grms. of oil containing 10 per cent. of rape oil with acid of 90 per cent. Mean result of five experiments 126°.

3. 15 grms. of oil containing 15 per cent. of rape oil with acid of 90 per cent. Mean result of five experiments 121°.

4. 15 grms. of oil, containing 20 per cent. of rape oil with acid of 90 per cent. Mean result of five experiments 116°.

These results likewise show that the elevation of temperature is inversely proportionate to the per centage of rape oil.—*Gewerbeblatt für Württemburg*, 1853, No. 26.

THE LOSS OF WEIGHT OF COFFEE BY ROASTING.

M. Lebreton* has estimated the loss of weight at 18 to 20 per cent. in Porto Rico, Rio, and Martinique coffee, and at 16 to 18 per cent. in Malabar, Bourbon, Ceylon, and Guadaloupe coffees, while in Mocha coffee it amounts to only 14 or 16. The loss of weight depends upon the time of roasting and the degree of heat. Damp or damaged coffee loses more than dry sound coffee.

MEANS OF PREVENTING WATER FROM BECOMING PUTRID.

It is stated† that the presence of metallic iron in water prevents it from becoming putrid. This influence is said to be very marked in water in which leeches are preserved, and renders the changing of the water unnecessary for very long periods. The slimy excretion of the animals appear to combine with the oxide of iron which is constantly being formed.

CASE OF POISONING BY INK.

Some time since a very unusual occurrence is stated to have taken place. A drunken soldier had given to him a large glass of ink under the pretence that it was porter. He drank it off, and after sleeping for an hour woke in the most violent pain. It was at once evident, from the black stains upon the lips and tongue, as well as from the residue of liquid left in the glass, that the symptoms were occasioned by the ink. The patient experienced extreme weakness, trembling of the muscles, and violent beating of the heart. These symptoms of gastro-enteritis were likewise accompanied by nervous affections, head-ache, and very painful cramps in the thighs. After four or five hours the patient commenced vomiting a pasty mass mixed with ink, which gave strong indications of sulphuric acid. Mucilaginous and saccharine beverages were administered, and after a short time produced the desired result. On the third day the patient was convalescent, but still complained for some days of weakness in the limbs, trembling of the thighs, and a very oppressive periodical pain at the back of the head, sometimes extending along the whole vertebral column.—*Oestrr. Zeitschrift für Pharmacie*, December, 1852.

DISCOVERY OF AMBER.

Pieces of amber have for some time past been found on the coast of Courland, but in such small quantities that it was hardly considered worth while to collect them. In recently cutting a canal for draining a lake near that of Anserche, on the eastern coast of Courland, between 57° 10′ and 58° 20′ of north latitude, and not far from the Gulf of Riga, pieces of amber were found, and on the search being con-

* *Agriculteur Praticien*, July, 1853.

† *Allgem. Polytechn. Zeitung*, 1853, No. 3.

tinued, more pieces were picked up on the banks of the lake of Anserche itself. At first the discovery was kept secret, as the lakes belong to the crown, and the amber was secretly sold for small sums by the persons who found it. But the inhabitants of the adjacent villages gradually became acquainted with the fact, and they made a practice of going *en masse* on Sundays to collect the amber. The priests, annoyed at seeing the churches abandoned, made inquiries as to the cause, and on learning it, made it known to the authorities. The quantity of amber already sold by the peasants to Jew dealers has brought them in not less than 4000 silver roubles (the rouble is 4 francs 5 cents), but that is considerably less than its real value. The pieces of amber are for the most part transparent, and some of them are so large that they fetch from five to six roubles. In some of the pieces winged insects have been found.—*Daily News.*

IMPROVEMENTS IN DEODORIZING COD-LIVER OIL.

BY SIR JAMES MURRAY, KNT., M.D.

This invention, for which a patent has been obtained, consists in subjecting cod-liver oil, placed in high pressure cylinders made of silver or other suitable material, to the influence of carbonic acid gas in combination with continuous agitation. For this purpose an apparatus of a similar kind to that employed in the manufacture of soda-water is made use of, which should be sufficiently strong to withstand a pressure of 200lbs. on the square inch. By means of agitators or beaters attached to the revolving axle of the cylinder, the carbonic acid, injected by a force-pump, is brought into contact with every particle of the oil, which thus becomes deodorized, the unpleasant odour or flavour being discharged by suitable contrivances into the atmosphere. Instead of oil alone, any admixture of it with alkaline, mucilaginous, or other solutions may be treated in a similar manner to that above mentioned.

THE SOLUBILITY OF BINIODIDE OF MERCURY IN COD-LIVER OIL.

I find by experiment that *cod-liver oil* possesses the property of dissolving *biniodide of mercury*, and as both are often administered at the same time, the medical practitioner will find it convenient when these remedies are required to be given together, to dissolve the biniodide in the oil. Solution is readily effected at the ordinary temperature of the atmosphere to the extent of *half a grain* to the *fluid ounce*, by rubbing down the biniodide in a small portion of the oil, mixing it with the remainder in a bottle, and shaking for a few moments; at the temperature of 50° C. two grains are permanently dissolved by one fluid ounce of oil.

I also find that biniodide of mercury dissolves with the same facility in almond, olive, and castor oils, also in chloroform, pyroxilic spirit, and melted lard and spermaceti cerate.

J. B. Barnes.

1, *Trevor Terrace, Knightsbridge.*

UNGUENTUM PYROLIGNI JUNIPERI.

Mr. Erasmus Wilson has furnished us with the formula for this preparation, which he has used with success in some cutaneous disorders :

℞	Ceræ Flavæ	4 ozs.	
	Adipis ppt.....	6 "	
	Sevi ppt.....	6 "	
	Olei Juniperi pyrolig.	16 "	Misce.

The pyroligneous oil of juniper, or juniper tar, is obtained by the destructive distillation of juniper wood. It is called in France Huile de Cade. We believe it is not prepared in this country, but may be obtained from Dr. M. Meidenbach, Aix-la-Chapelle.

A NEW MODE OF MENDING AN OLD SIEVE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have been employing myself this evening, since the shop has been closed (we all in this town close at eight o'clock), in doctoring an old sieve, and as the result is satisfactory to myself I communicate the same to you. The sieve is a wire

sieve, and had been laid by for a considerable time as useless on account of the many holes and fractures in the texture of the wire, besides which the meshes were very much clogged. I first had the sieve well washed with soda and warm water, then when thoroughly dry passed the sieve slowly over a gas flame, which soon carbonized what remained in the meshes and allowed it to be removed with a dusting-brush. I then filled the torn and broken parts of the sieve with gutta percha, by cutting a bit from a sheet of the article about the size of a stick of lunar caustic, just melting the end in the gas flame and rubbing it over the broken part of the sieve, as soon as it is applied applying a little friction over it with my moistened finger. I have thus obtained a useful sieve from one which would otherwise have been thrown away.

Thinking the hint may be useful to others, I am your obedient Servant,

Weymouth, Sept. 22, 1853. THOMAS BARLING, M.P.S.

TRADING SURGEONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—May I beg the favour of your inserting the following in the forthcoming Journal, should it meet your approval? I am, Sir, yours obediently,

Gravesend, Sept. 17, 1853. M. P. S.

"*To the Editor of the Medical Circular.*

"Sir,—You publish in your last Circular communications from correspondents, describing two varieties of unhealthy fungi on the medical profession. In the first case, though not directly stated, the clear inference is that the individual in question has every qualification and necessary licence of the profession, but in announcing his advent to a new location he 'bills the neighbourhood' to the effect that all recipes and prescriptions will be cheaply and accurately prepared, that everything sold at his establishment is of good quality, and that all articles of a domestic and miscellaneous character, such as are usually kept by Chemists and Druggists, will be found in his stock, or immediately procured to order.

"In the other instance, your correspondent signing himself 'Gravesend,' introduces to us one of his townsmen whom he is pleased to term a 'Prescribing Chemist and Druggist;' but on comparing the two they will at once be seen to belong to the same genus, and which I would designate as the 'trading Surgeon.' Here we have hair-powder and honey-soap, cod-liver oil and soda-water, all arranged around the tablets which set forth 'Medical and Surgical Advice gratis,' 'Midwifery, Cupping,' &c., &c.* The cases are parallel; every feature identical; the one a daguerreotype copy of the other, excepting that in one case the qualification exists, in the other it is pretended to. Now, Sir, a legitimate Chemist and Druggist myself, for my

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* The following is the article in the Medical Circular to which our correspondent refers. We do not, however, infer from what is stated that the individual possesses no legal qualification.—ED. PHARM. JOURNAL.

"TO THE EDITOR OF THE 'MEDICAL CIRCULAR.'

"SIR,—The profession is sufficiently thronged with legitimate practitioners to render the working into practice a task of no small difficulty, but the struggle is rendered much more harassing than it need be by the inroads of the prescribing Druggist. Against their counter-practice as generally carried on, I believe we have no protection, but surely there are some means by which the following piece of effrontery can be punished:—An individual keeping a Chemist's shop in Gravesend, has, on the door-post, a plate with his name as Surgeon, Dentist, and Accoucheur, and in the window a framed glass with the announcement, medical and surgical advice gratis, midwifery, cupping, bleeding, galvanism. Is he not, thus, to all intents and purposes, claiming to be a general practitioner? Neither does he confine his 'medical and surgical' advice to those who apply in his shop, but also attends, if sent for. With the public this imposition passes current, believing that no man would openly and boldly declare that he practised the three branches of the profession unless he were fully and legally qualified to do so. Suppose that, from noticing the announcement in the window, a person applied for his advice, received medicine and paid for it, would he not, on the evidence of that person, be liable to a prosecution under the Apothecaries' Act? "I am, Sir, your obedient Servant,

"GRAVESEND."

["Our answer to the inquiry is in the affirmative, and advise some qualified man to catch the marauder."]

fraternity I emphatically disclaim them both, and I assure you we think ourselves not 'handsomely done by' in these constant efforts of the profession to foist their illegitimate offspring upon us. Why should we be ever hearing these querulous complaints about the confusion between Chemist and Surgeon? The remedy is plain; let the Surgeon cease to be a tradesman, and the distinction is broad. In what estimation should we hold the artist who made his studio a sale-room for canvas, paint, and pencils? No, gentlemen, practise your profession and leave the Druggist to his trade. You will find it far easier and more practical to punish or exclude one of your own body for trading than to run-a-muck against a world of quacks for practising; you will then draw a line of distinction which the public cannot mistake, and in any attempts to legislate in that direction you will have popular opinion with you as well as the hearty co-operation of every

"Legitimate Chemist and Druggist."

UNQUALIFIED ASSISTANTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Allow me to call your attention to the following case, as an instance of the injury inflicted on Druggists and Assistants by the improper management of medical charities.

At an infirmary near me an Assistant has just been appointed to dispense the medicines, his wife as nurse and housekeeper; the salary for both eighteen shillings a week, coals, candles, and rent free. What should you think was his former occupation? A gentleman's servant! His predecessor came for a few days to instruct him, and he was a bookbinder!!

At this institution advice and medicine are given indiscriminately to all comers save a few, and they pay half-a-crown for the whole attendance, and have all their medicines *gratis*. A dispensary on a new plan is also mooted for this neighbourhood, to be supported by subscription, but the patients to pay sixpence for medicine, whatever it may be. I understand a dispenser of the gentleman's-footman style is to be engaged.

If medical men sanction and encourage this style of Assistants and this indiscriminate supply of medicine, I ask—What is the use of spending money on education? I remain, Sir,

E. M.

[Our Correspondent has authenticated his statement. The infirmary is not far from Russell Square. If medical men having the charge of such institutions appoint as dispensers persons of the class described, they have no right to complain of the irregular proceedings of quacks in general.—Ed.]

SHEEP-DIPPING COMPOSITION.

Gloucester County Court, September 1st, 1853.

JOSIAH CASTREE *v.* S. H. HAYWARD.

This was an action to recover £43, the damage alleged to have been sustained by the Plaintiff in consequence of the use of a sheep-dipping composition sold him by Defendant. Mr. Carter and Mr. Matthews appeared for the Plaintiff; Mr. Powell and Mr. Smallridge for the Defendant.

Our space does not admit of a lengthened report of the trial, in which a number of witnesses were called to prove the sale of the composition by Defendant, the assurances or warrantry under which it was sold, the application of it as directed, the death of several sheep and lambs shortly afterwards.

The composition was described in printed bills as "the cheapest and most effectual destroyer of all ticks, &c., injurious to the flock, preventing the attacks of the fly and shab, thereby greatly improving the quantity and quality of the wool." It is stated in the directions, "Particular care must be taken to keep the head of the sheep out of the liquor, and also the liquor WELL STIRRED, or it might prove FATAL." The Plaintiff's witnesses who had been engaged in the dipping deposed that the directions had been strictly attended to. It was, however, admitted that one man dipped the lambs without assistance, that their legs were not tied, and the head of one of them

was immersed in the liquid. The evidence as to the proportion of water added to the composition was confused, and in some respects conflicting. One witness, while mixing the composition was called away, and the servant-maid finished the mixing. The death of several of the sheep and lambs was proved and admitted; but the question was whether the fault was on the part of the Defendant for having sold a dangerous compound without sufficiently explicit instructions, or whether the result arose from carelessness in the application. The Defendant had no direct means of confronting the witnesses who had used the composition, as neither he nor any person on his behalf had been present, but he proved generally the success and safety with which the composition had been extensively employed by many persons when his instructions had been observed.

His Honour, in charging the jury, held that no false statements had been made by Defendant at the time of the sale. The composition was warranted to be a most effectual destroyer of animal life—so it had proved. Thus far there was no breach of the warrantry; but the paper of directions for use was an implied warrantry of safety provided these directions were complied with, which it was the duty of the Plaintiff to prove. On this point the parties were at issue, and the evidence was not conclusive.

Mr. Carter inquired of what the composition consisted? *Mr. Powell* objected to the question being put, and argued that if this were allowed, any person desiring to obtain another person's private recipe might bring an action for some alleged injury for the purpose of eliciting the information in court, and the divulging of the secret might entail on the party the loss of a large income.

His Honour ruled that the question was a legitimate one, on which it was intimated on the part of the Defendant that he would rather relinquish his defence than divulge his secret. He offered to hand the recipe confidentially to the judge, but this did not satisfy Mr. Carter. Eventually, after some consultation, it was mutually arranged that the verdict should be for the Plaintiff, damages £27 10*s.*, each party paying his own costs. This sudden termination of the case precluded the examination of several of the witnesses for the defence, who had used the composition for years with a good effect, and without injury.

In a case of this kind the Chemist is at a great disadvantage. He may have supplied many cwts. of the composition annually without any bad result. On one occasion a misfortune may occur from some carelessness or inadvertence, which there are no means of proving; and on the testimony of the parties who used the composition and who were guilty of this inadvertence or carelessness, if such existed, the Defendant is required to pay damages.

We cannot understand on what principle of justice the Defendant was called upon to give up his formula, the damage claimed amounting to only £43, which was reduced in the verdict to £27 10*s.*, while the secret might be worth to the possessor several hundreds per annum. This appears to us to be an ingenious and arbitrary mode of applying the screw to the Defendant, and thus obliging him to yield whether right or wrong, as persons usually do when addressed with the impressive language, "Your money or your life."

TO CORRESPONDENTS.

Dispensator Juvenis inquires how the following can be made to assume the form of a pill sufficiently small to be swallowed by one of the genus Homo:

℞ Tereb. Com. g. iij., Pil. saponis c. opio. gr. iss., Ext. Rhei. g. i., ♏ ft. pil. i.

By adding calcined magnesia (about ½ g. to each pill), triturating with the turpentine, and waiting a few minutes before adding the other ingredients, the pills may be made of a moderate size.

A Member (South Devon).—(1.) To preserve the colour of roses or other flowers, they should be dried at a very moderate heat and kept in the dark. We doubt whether the colour of roses can be preserved in spirit unless by the addition of an acid.—(2.) Spirit licences are only granted to wholesale distillers or dealers, and publicans, or hotel-keepers. See vol. vi., p. 99 to 106. The licence for keeping a still is 10*s.* 6*d.* per annum.

Juvenis (Bradford).—We cannot suggest any method of bleaching cod-liver oil which might not injure its quality. A process patented by Sir J. Murray is published in another part of this number, but we have no faith in it.

Delta (Cheltenham).—The extract appears more glutinous than usual, but we do not detect any defect in its quality.

B. F. L. (Manchester).—The brighter coloured sample of ointment is to be preferred.

Dunelm (Lancashire).—We cannot answer the first question. Smoke diffused in the atmosphere is prejudicial to health.

Amateur de Chimie (Evesham).—Phillips's Translation of the Pharmacopœia. Highley, Fleet Street. 10*s.* 6*d.*

Mr. Fresson (Stevenage) not having been able to attend the Special General Meeting, wishes to record his protest against the factious opposition to the Council, and recommends the most prompt and decisive measures for putting an end to the dispute.

F. A. C. (Rochdale).—(1.) The registration fee for an Apprentice or Student is two guineas.—(2.) See the Pharmacopœia, Phillips's Translation.

F. W. S. V. (Deal).—(1.) Candidates cannot be admitted to pass the Major Examination until they are twenty-one years of age.—(2.) A certificate of having been engaged three or four years as a pupil is received as equivalent to indentures.—(3.) A person however young, inexperienced, or ignorant, may commence business as a Chemist and Druggist; as a Pharmaceutical Chemist he must be not less than twenty-one, and must be registered by the Society.

We beg to acknowledge the communication of Mr. Strange, of Manchester.

Adjutor.—(1.) The word *anhydrous* is pronounced as it is spelt.—(2.) Bitartrate of soda, see vol. xii., p. 604.—(3.) Chromate of potash is made by calcining chrome-iron ore with nitre or with carbonate of potash.

M. P. S. (Manchester).—Copying ink, see vol. xii., p. 136.

M. P. S. (Preston).—Watchmaker's oil, see vol. xii., p. 604.

E. (Bermondsey).—We have no recipe for "Jockey Club Bouquet."

P. P.—Carpenter's Manual of Physiology. Churchill. 12*s.* 6*d.*

J. M. (Taunton).—(1.) Taylor on Poisons. Churchill. 12*s.* 6*d.*—(2.) Application should be made to the Secretary, 17, Bloomsbury Square.—(3.) Hydrometers and specific gravity bottles are sold by all dealers in chemical apparatus, price from 1*s.* 6*d.* upwards.

J. Thomas (Machynleth).—(1.) Santonine is used as a vermifuge, dose from four to six grains.—(2.) Beasley's Formulary contains much of the information required.

A Subscriber (Mile End) will find his question answered in this number.

W. J. (Southwark).—The label for Camphorated Dentifrice does not make it liable to stamp duty. The other label for Gregory's Powder is a case of sailing near the wind, and would be safer without the recommendation, although no disease is mentioned.

G. C. (Portsmouth).—Tar is sometimes used for the purpose.

B. W. R. (Goole).—The best excipient for calomel pills is conf. rosæ can. They should not be rolled in magnesia, but in starch or liquorice powder.

A Sufferer (Boston) shall be answered by post if he will give his name.

Alpha.—(1.) Skeleton leaves are prepared by macerating the leaves in water until the soft parts have decayed, and then removing these with a brush.—(2.) Shells are polished by putting them into weak acid and rubbing them.

R. T., M. P. S.—See the above.

An Inquirer.—No dependence can be placed in the indications of the "weather-glass" or "storm-glass." The crystallization is modified by alteration of temperature and other changes in the state of the atmosphere.

The Phytological Club will resume its meetings in November.

Erratum.—September number, p. 105, *for* 4 to 5 per cent., *read* 4 to ·5 per cent.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. V.—NOVEMBER 1st, 1853.

THE PECUNIARY OBLIGATIONS OF PHARMACEUTICAL CHEMISTS.

"No person having any feeling of honour or independence would entertain a wish to enjoy the privileges of an institution, or share in its benefits, without also sharing in its expenses."

It not unfrequently happens that the truth and justice of an abstract principle are fully acknowledged, while the application of the principle to practice is either not recognized or becomes a subject of dispute. That which is known to be right in theory is sometimes seen under a different aspect when brought into collision with individual interests, and as there are exceptions to every rule, there is a natural disposition in the human mind to claim the benefit of such exceptions. For example—the inhabitants of a parish or district, having no local Act for raising a watering rate, are annoyed by the dust. They raise a subscription for the purpose, and a committee is appointed to make the needful arrangements. As this is for the general benefit, it is presumed that all will contribute, which many—probably the majority—do without hesitation. But there are many exceptions—not that the justice of the principle is disputed—but some parties have their own crotchets about the manner in which it ought to be done; some object to the committee, or take umbrage because they were not consulted at first; some put on an air of indifference, knowing that it will be done whether they contribute or not, and say it is very well for those who care about it to pay the expenses; others make it a rule never to interfere with public business; others again are never at home when called upon, and never think of sending any money. This is what occurs, we might almost say, in every case in which a public object is carried out by subscriptions not enforced by Act of Parliament. There are generally enough public spirited and liberal persons, who, for the sake of attaining the object, are willing to pay rather more than their share; there are always some who will pay nothing unless they are compelled; and there is a middle class, frequently a numerous one, who are willing to share the expense fairly with their neighbours, but who will not submit to be over-taxed while others evade the payment. Hence the necessity for Acts of Parliament to regulate matters of this kind, in which justice demands that each shall contribute for the general benefit.

The Pharmaceutical Society originated in a defensive movement. The whole trade were interested in the question, as the threatened innovation was calculated to affect all Chemists and Druggists. Some attended the meetings, others stayed at home—some subscribed various sums from £10 to 10*s*., others nothing. The result having been satisfactory, and the amount collected having been more than sufficient to defray the expenses, all were content.

The Pharmaceutical Society, which arose out of this movement, was established for the future and permanent benefit of Chemists and Druggists, and all were invited to join on payment of a fixed subscription. The inducements offered were of two kinds: first, the advantage of union as a means of defence; secondly, the enjoyment of certain privileges of membership;—the former consideration being addressed to the public spirit, the latter to the private interest of the Members. For a time the former was the stronger impulse, but this excitement gradually subsided as the causes of apprehension ceased and were forgotten. Then the usual inquiry, *cui bono?* was raised, and the Members were kept together by the hope of introducing a reform which should raise their

status and professional character, and by the desire to enjoy the credit of being identified with an Association calculated to increase public confidence. When the Charter was obtained this became a strong incentive, and the name of the Society was paraded on labels and shop bills, and the Certificate of Membership displayed in shop windows. The trade advantages of membership were thus acknowledged, and it could not be denied that the parties who voluntarily established and maintained a Society at their own expense for the promotion of so important a reform in their profession, were justly entitled to the credit which they enjoyed. But some Members, while they made full use of this as a recommendation in their dealings with the public, used very different language in their correspondence with the Secretary. In their shops the Pharmaceutical Society was held up as a guarantee of qualification and genuine drugs; in reply to the application for subscriptions its utility was called in question; and not a few ceased to subscribe while they continued to use the Society as a puff. Some actually joined the Society for the purpose of obtaining the Certificate of Membership, which they retained without even paying a second year's subscription. This naturally gave offence to those Members who were regular in their payments, and who appealed to the Council, calling upon them to administer justice to all parties, and not to allow persons to sail under the colours of the Society without contributing their share to its support, But the powers possessed by the Council under the Charter were not so clear and explicit on this point as to justify proceedings in a court of law against the delinquents.

Passing over a few years we find the Charter confirmed by Act of Parliament, and increased importance given to the Society, by the title conferred on those who are registered under its authority. The evasion of the subscription by persons retaining and exhibiting the Certificate of Membership is met by a special provision in the Act, which also provides for the payment of fees on registration, and admits to this privilege those who were Members according to the terms of the Charter. The construction and intention of this latter expression has given rise to the dispute which has involved the Society in so much annoyance, and we have been induced briefly to trace the circumstances which have led to the present position of affairs, for the purpose of placing the question in what we conceive to be its true light.

In the following letter our correspondent disclaims the desire to sanction the evasion of the subscription by those who participate in the benefits of the Society, and we have taken as our text an extract from his letter, which embodies the principle for which we have been contending.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I should not have troubled you on the present occasion, but I am forcibly inclined to the opinion that the leading articles—those especially relating to the proceedings at the late meeting—which appear in the Journal of the present month, are very likely to misguide the judgment of its readers, and convey to their minds the impression, that the mover and seconder of the amendment, as well as the "Members in Dover," and those who conscientiously hold similar views, are actuated only by a "desire to put their hands in the pockets of their neighbours;" also to "evade the payment of their subscriptions," and induce their fellow Members to pursue a like course; and, moreover, that they regard the keeping of "their pecuniary engagements" as a matter of no moment whatever; in short, a perfect "absurdity." Undoubtedly, there are some that will arrive at this conclusion, thinking it implied, although to assert as much would be to give utterance to an absolute libel, as affecting the honour and integrity of the parties concerned.

In the Journal for September, the Members were clearly and distinctly informed that the Council possessed "the power of expulsion;" to this might be attributed the presumption that they, the Council, would either move or cause

to be moved a resolution in furtherance of that power. Some few Members considered that such a step would be highly impolitic—that it would tend to injure rather than benefit the Society, inasmuch as it would be likely to increase the hostility, and force the vexed question into a court of law, by which the public would become acquainted with the details of a controversy of which it would be better that they should remain in ignorance. Such was evidently the feeling of the "Dover Members," as was plainly indicated in their advertisement, the reading of which was moved for at the meeting, and which is also entered in the report of the Transactions.

The amendment was drawn up with the like feeling, and for the purpose of assisting in bringing the unpleasant and much to be regretted differences to "a satisfactory and harmonious conclusion," without the admixture of personal or party excitement; and in order to meet the objections of some of the Members, and suit it to the wishes of the Council, the words "in regard to the bye-laws of the Society," were withdrawn. The mover of the amendment, in the course of his remarks, did certainly make use of the observations which have been selected and which form the sum and substance of one of the "leaders" referred to, but it must be borne in mind that they were intended to illustrate the difficult nature of the point at issue, which was treated as a question of qualification or non-qualification alone, entirely apart and distinct from the question of membership and subscription.

I have no wish, Sir, to enter into an argument upon this subject, but permit me to state that the cases drawn do not appear exactly to the point, and I cannot but think that it would have been much more to the purpose to have gone back to the dates of the Acts of Parliament, and no doubt the "Apothecaries' Act" would have served that purpose, as it would have shown the position of the exempted parties at the time of the passing of that Act.

Be that as it may, I am quite assured that no person having any feeling of honour or independence, would entertain a wish to enjoy the privileges of an institution, or share in its benefits, without also sharing in its expenses, and I am likewise sensible of the fact that no one can be associated with any Society of a literary or scientific description, for a less amount than one guinea per annum. Still, there are some that hold the opinion that the qualification should in nowise be connected with, or dependent on, the payment of an annual subscription, which it is desirable to consider as an equivalent for advantages received, and not as a mere tax, as suggested.

Opinions may differ, but whether the minority in a discussion have or have not passed an examination, is of no consequence whatever, and can in nowise affect the case, since it is possible for a young man to be "ground up" in symbols, and well-tutored in analyses, and yet be wanting that judgment, and lack that experience which time alone will give, and which has always been recognized by the public, and in most cases by the legislature, as a test of acquirement and qualification.

I have only now to repeat the former suggestion, that there may be some who will arrive at the conclusion set forth in the commencement of this letter; if so, I challenge them with all due deference to produce a single expression, either connected with the "advertisement" or the amendment, or the language employed by its mover and seconder, that will justify them in so deciding, or warrant them in forming a judgment at once unfair and illiberal.

I would tender you an apology for this communication, but I believe, Sir, it will not be needed, seeing that the words "selected" and somewhat severely criticised were those used by

Yours, respectfully,

Stockwell, October 11th, 1853.

JNO. FELLS.

It was not our intention to reflect upon the honour and integrity of the mover and seconder of the amendment, or of the Dover Members, as our corre-

spondent appears to suppose, but simply to point out the error of treating the question "as a question of qualification or non-qualification, entirely apart and distinct from the question of membership and subscription."

It is essentially a money question and nothing else. With regard to the qualification there is no dispute. The qualification of the original Members under the Charter was assumed, the Act not being retrospective, that of future Members will be tested by examination. But there are two conditions which must be complied with by those who participate in the benefits of the Society. The first relates to qualification, the second to payment; and (apart from the legal view of the case, which we are not now discussing) we have never heard any argument advanced showing the JUSTICE of exempting some parties, and taking subscriptions from others. The fact that some of these parties do not desire the full privileges of membership, but are content with that of registration, does not entitle them to evade the payment altogether. All that justice requires is that they shall pay in proportion to the benefit they enjoy. We have a very simple method of estimating this proportion by reference to the fees payable by persons registered under the 10th clause of the Act, to which scale of fees no objection has been raised.

The amount payable for registration as a Pharmaceutical Chemist is ten guineas; for the additional privileges of full membership five guineas. The sum of ten guineas is equivalent to an annual subscription of a guinea. Consequently the Members under the Charter receive an equivalent for their subscriptions in the status they enjoy as registered Pharmaceutical Chemists, and the additional privileges of full membership are thrown in without further payment in consideration of their past services in establishing the Society.

The above estimate deduced from the scale of fees, is in our opinion in accordance with the actual relative value of the privileges of registration and of full membership; as the register of Pharmaceutical Chemists *will in the course of a few years* create a distinct boundary line between the recognized Pharmaceutists and the unqualified Druggists or hucksters. The trade advantages of this distinction will increase with the growth of the Society, and although it is probable that a large majority of the registered Pharmaceutical Chemists will find it to their advantage to be Members, there can be no doubt of the fact that their *status* as Pharmaceutical Chemists may be fairly estimated as at least two-thirds of the privileges of full membership.

We regret the necessity of enlarging upon a subject which appears derogatory to the character of a Society having some pretensions to science, and founded for the purpose of raising the professional status of the parties concerned; but we must deal with human nature as we find it, and when we see so much disposition to evade the payment of the small fee or subscription necessary to support the vitality and respectability of the Society, and when we hear doctrines put forth founded on a one-sided view of the question, and calculated to encourage such evasions, we advise the Members seriously to consider whether the Society is worthy of support? If it be, by whom is it to be supported? Is it to be supported by contributions from all who sail under its colours and derive trade advantages from their connexion with it, whether by registration or membership? or are those who enjoy two-thirds of the privileges to pay *nothing*, while the entire expense is borne by those who also enjoy that which is worth one-third more?

We accept Mr. Fells' illustration of the Apothecaries' Act, and adhere to the principle then acted upon. The Apothecaries who were in practice before the passing of the Act of 1815 were allowed to continue in practice unmolested. They were invited to join the Society of Apothecaries on compliance with the regulations, and on payment of the fees. Failing to do this, they were not registered or in any way identified with the Society.

Chemists and Druggists who were in business before the passing of the

Pharmacy Act, are allowed to continue in business unmolested. They have been invited to join the Pharmaceutical Society on compliance with the regulations and on payment of the fees or subscriptions. Failing to do this, they are not registered or in any way identified with the Society.

In the case of the Apothecaries the fees were required in one payment. Pharmaceutical Chemists are accommodated by the option of paying either a life-fee or an annual subscription. The duration of the privilege depends on the amount paid—if a life-fee, the privilege is for life; if an annual payment, the privilege is for the year. The pecuniary obligation is the same, whether ready money is required or credit is given.

THE FRUITS OF DISCORD.

When a dispute arises in a family, or in a society, nobody cares what is the cause of it. Persons not interested in the matter dismiss it in a summary way, with the remark, "It is a quarrelsome family," or "The society is going to pieces." The merits of the question are not understood, except by the parties concerned—sometimes not even by themselves; it is enough for others to know that certain of their neighbours are engaged in the foolish occupation of a quarrel, in which it is presumed that both sides are in the wrong, although there may be a difference in the degree.

Such is the cloud which has lately hung over the Pharmaceutical Society, and such are the remarks which we hear occasionally from persons who neither know nor care what is the nature, origin, or probable duration of the malady. There are those who long ago predicted that the Chemists could not work together or conduct the affairs of their body harmoniously, and who begin to exult in their own penetration, judging from recent symptoms that there is "rottenness in Denmark," and that their prophecy is about to be fulfilled.

The injury to the "fair fame" of a society is not the only damage which results from discord among its Members. During the prevalence of this misfortune its functions are arrested, its constitution impaired, and its physical strength wasted in febrile excitement and delirium. But as in some disorders a cutaneous eruption or an attack of fever will sometimes bring out and dispel the latent seeds of disease, and after the crisis is over, the constitution resumes its healthy vigour, and the patient becomes more robust than he was before the attack, so in a society in which there may have been lurking some feelings of discontent or disaffection, the dislodgement of the offensive matter may relieve the congestion, the application of suitable remedies may restore the functions of those organs which had been in a morbid state, and the constitution thus recovering its tone and energy, not only survives the shock, but being relieved from the latent causes of indisposition, acquires a healthy vigour which it did not previously possess.

This process of cure is, we believe, about to be exemplified in the case of the Pharmaceutical Society.

During several months the attention of the Council has been diverted from the important duties which pressed upon them, and engaged in resisting opposition, and endeavouring to bring the questions on which a dispute had been raised, to a favourable termination. In the month of June, when the pressure of business was most urgent, and attended with no little difficulty, the Society was paralysed, its vitality suspended, and the hands of the Council tied. Subsequently much valuable time has been wasted in re-discussing questions previously settled, and in vain endeavours to conciliate the disaffected. But the crisis is over, the source of the disease has been probed and laid open; and the Council having resumed the business of the Society in earnest, may hope to surmount the difficulties with which they have been beset. It has been necessary, as reported in the Transactions of the Society (page 201 of this number), to obtain Counsel's opinion on some questions which have arisen chiefly from the suspension

of business, and the consequent delay in the examination and admission of candidates, and the result has shown the policy of acting under legal advice whenever any doubt exists as to the construction of the laws. The course to be taken being now clearly defined, the Council will proceed with their duties without hesitation.

It is worthy of remark that the questions which have been made the sources of dispute and difficulty have been temporary and ephemeral in their nature. They relate to circumstances which cannot occur again—namely, the mode and terms of admission of Members under laws now obsolete. The admission of future Members will either be under the tenth clause of the Act, which is clear and explicit, or under the 2nd Bye-law, which refers to Associates of 1842. There is therefore no reason to anticipate a recurrence of the annoyance which has lately taken place on these questions, nor can any injury or inconvenience to any parties arise from the course which has been adopted. The odium which has been brought on the Society by the recent disagreement will gradually subside, and although the public will not take the trouble to inquire into the merits of the dispute, the fact that it ever existed will be forgotten, except by the Members of the Society, whose experience has taught them the impolicy of internal dissension.

THE ORGANIZATION OF THE PHARMACEUTICAL SOCIETY.

Hitherto the organization of the Society has scarcely assumed a regular and official character; for although the correspondence has always been carried on through the medium of local secretaries, no specific regulations exist with regard to the appointment of these officers. As we stated in our number for January, 1853, many of the local secretaries have acted voluntarily in that capacity, much to the satisfaction of their brethren and the advantage of the Society, without any official appointment. In numerous instances the secretary in London has continued to communicate with the Member who happened to be his first correspondent in the town, and who has thus acquired the position of local secretary. In other cases the appointments have been made by the Members at meetings held for the despatch of business connected with the Society. In the month of December last year a circular was issued to all the local secretaries on the subject of the admission of Members under the Bye-law of November, and on that occasion it was ascertained that many of the parties were not aware of the precise nature of their office; some did not previously understand that they were considered as local secretaries, although they had corresponded with the Secretary for several years on the business of the Society.

The Council, in their last Annual Report in the month of May, taking these circumstances into consideration, directed the attention of the Members in the several provincial towns throughout the kingdom to the advantage of organization among themselves, and recommended that meetings be held in the several towns as early as might be convenient after the Anniversary, for the purpose of appointing Local Secretaries for the ensuing year.

The following letter from a correspondent revives the subject, and also contains a proposition which we think deserves the attention of the Members. We allude to the organization of local unions comprising towns in easy communication with each other, and the appointment of delegates to attend the General Meetings of the Society. By an arrangement of this kind the business of the Society would become more extensively known and understood, and the Members residing at a distance from the metropolis would feel more identified with the Society, they would have an opportunity of making known their opinions, and would take more interest in the proceedings.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—When I received the intimation of the recent Special General Meeting, my impression was that the Council had taken an impolitic step. I thought it

was calculated to give an exaggerated importance to an agitation which appeared to be as reckless as it was ill-advised. And what took place at the meeting I think proved that that impression was not groundless; for there the opposition was revealed in its full dimensions—paltry in number and as paltry in the talent displayed. Now, however, I am glad that that meeting did take place, as it proved that the Council has the full confidence of the Society, a fact which will probably in some degree compensate for the annoyances to which it has been subjected. I see it was mooted, although in an irregular way, that the Journal should be discontinued. The parentage of this proposal was obvious enough—for one of the twin agitators charged the Journal with "*indoctrinating*" the country members, while the other denounced it in terms which would have been more appropriately applied to the Inquisition or Juggernaut, or any other hideous engine of cruelty and oppression. In answer to the first, I, as a Country Member, beg to say that the Journal "indoctrinates" us only in what appears to *ourselves* to be just and fair and reasonable; and further, that a man who thinks for himself does not *necessarily* bully and bluster as if he were the very autocrat of thinkers, and the rest of the world mere mental serfs. To the other I would say that the forcible feeble style of speaking does not generally indicate intellectual superiority—on the contrary, it is the tone assigned by a rather high authority to "the wrathful dove or most magnanimous mouse."

I trust the good sense of the Society will not for a moment tolerate the proposal to discontinue the Journal. In the mean time it is the very breath of the Society, and so long as the same talent is displayed which has hitherto marked its management, I think we should be proud of having such an organ. Not that I consider it absolutely perfect, or fully to meet the requirements of the general body of Pharmaceutists; for it has often struck me that there is too large a proportion of the *purely scientific* in it, as if the wants of the *trader* were of inferior importance to those of the *man of science.* The Pharmaceutist, as embodying *both* those characters, has a corresponding variety of tastes; and therefore, while providing food for his brain, it must not be forgotten that his daily bread is the ultimate aim of his mental exertions.

As I have already trespassed too long on your patience, I shall now state the immediate object I had in thus addressing you. It is to suggest to the Council the advisability of devising a system of local organization, by which the Society may give an united expression of opinion on any subject affecting the whole. At present we are merely *disjecta membra*—scattered here and there—nominally bound together but practically separated "far as the poles asunder." This state of things would of course be aggravated a hundred-fold if we had no medium of communication and intelligence such as the Journal; but as it is, we are too much isolated to give effective utterance to the general views of the Society. From our position, the Country Members are *spectators* of, rather than *actors* in, the doings of the Society. Had local organization existed we would not—as on a recent occasion—have seen a Member assume the leadership of 2000 Country Members without their knowledge or consent, even though it was with no other intention than to give *rhetorical* effect to his arguments. I would therefore suggest the immediate organization of Local Unions, with secretaries under the direct surveillance of the metropolitan officials; such Unions to comprise those towns in easy communication with each other; and each Union to send a delegate to the General Meeting in London or Edinburgh, as the case may be. Until we have some such mode of united action, it is obvious that the Society will not exercise its legitimate influence over its own Members and the public at large; and now that we form one of the institutions of the country, we should lose no time in proving we are fully equal to its corresponding obligations.

I am, Sir, your obedient Servant,

Montrose, Oct. 18, 1853. GEORGE BURRELL.

THE PLATE LICENCE.

Several correspondents have inquired, whether the regulations now in force with regard to the plate licence affect the interest of Chemists who sell smelling-bottles having silver caps. The law on this subject is not altered, but we have ascertained on inquiry, that in consequence of the extensive evasion of the law, chiefly by the makers of gold and silver-headed canes and other fancy goods, the authorities have resolved to use extra diligence in enforcing the provisions of the Act. The following paragraph is extracted from the *Illustrated News* of October 1:—

Plate Licences.—On Tuesday the Stamp Office commenced the issue of licences to deal in plate, to remain in force until the 31st of July, 1854. Tobacconists, walking-stick and umbrella manufacturers, whip-makers, and all other trades making or *selling wares mounted with the precious metals are considered dealers in plate;* and as the new stamp duties are to be rigorously enforced, such parties vending articles into which silver and gold are worked, unless licensed, will be liable to a penalty.

Chemists who sell silver or gold-mounted smelling-bottles are liable to the penalties if unlicensed, provided the weight of silver in any one article is not less than 5 dwts., or the weight of gold 2 dwts.

The amount payable for licence to sell silver or gold goods exceeding the above weights, is £2 16*s*. This amount is further increased if the quantity of silver exceeds 30 ozs.

It is not improbable that the gentlemen who are engaged in the purchase of unstamped medicines which ought to be stamped, on behalf of the Commissioners of Inland Revenue, may require a supply of smelling-bottles for a similar purpose. It will, therefore, be prudent to pay attention to the weight of the silver caps of smelling bottles, for if any of these exceed 5 dwts. the vendor is liable to the penalty unless licensed. It should also be known, that the fact that any of these goods are alloyed (or adulterated) with other metals would not affect the calculation of the quantity, as all goods sold as silver are held to be silver so far as the licence is concerned.

THE TEA, COFFEE, CHOCOLATE, AND PEPPER LICENCE.

A part of the financial scheme of the present Chancellor of the Exchequer consisted in increasing the amount payable for the licence to sell tea, coffee, chocolate, and pepper, by adding a sum equal to five per cent. on the rental exceeding £50. Urgent remonstrances having been made against this proposal, especially by persons only desiring to sell one of the articles on the list, and who would have been subject to the entire tax, the Chancellor of the Exchequer reconsidered the subject, and the law remains as it was. The amount payable for licence to sell tea, coffee, chocolate, and pepper, is 11*s*. 7½*d*. per annum. Chemists may sell pepper mixed or for medicinal use, but if they sell it for domestic purposes they are liable to the tax for licence.

The 59th Geo. III., c. 53, s. 21, exempts cayenne pepper from licence duty.

No licence is required for the sale of vinegar, the duty being paid by the manufacturer.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

At a Meeting of Council held on the 7th of September, the Secretary reported the Resolutions passed at the Special General Meeting on the 6th:—

"*It was Resolved*, That the Members of the Society having at a Special General Meeting held on the 6th inst., declared the conduct of William Dickinson to be incompatible with his position and functions as a representative of the Society, and his conduct appearing to the Council derogatory to the honour of his office, he is hereby required to give an explanation of the same."

In accordance with Bye-law, sec. 17, clause 1,

"*It was Resolved*, That a Committee be appointed to furnish Mr. Dickinson with the charges against him, setting forth acts and printed statements which are considered derogatory to his character as a Member of the Council, of which they require explanation."

"The Members of the Society having, at a Special General Meeting held on the 6th instant, declared that the conduct of William Bastick is incompatible with the position and functions of a person holding a responsible office in the Society, it was resolved that he be now removed from the Board of Examiners."

A SPECIAL MEETING OF THE COUNCIL

Was held on the 14th of September, "to consider certain questions relating to the Bye-laws, and the proceedings of the Council arising out of the Special General Meeting."

This Meeting was summoned by the President, in consequence of an intimation which had been made to him, which led him to doubt whether the Council had the power to remove a Member of the Board of Examiners from his office during the current year for which he had been appointed.

On this question and some others which had arisen in reference to the Bye-laws, it was considered expedient to obtain Counsel's opinion. It was therefore resolved, "That the Resolution of the last Meeting of the Council, relating to Mr. Bastick of the Board of Examiners, be rescinded."

"That in order to clear up questions which have arisen or may arise in reference to the Bye-laws and the mode of carrying the Pharmacy Act into effect, it is expedient that the advice of Mr. Tidd Pratt be obtained, and that a Committee be appointed to confer with him on the subject, the President, Vice-President, Messrs. Bell, Garden, Sandford, and Squire, to form such Committee."

The Committee met on the 20th of September, in conference with Mr. Tidd Pratt, and after a lengthened discussion of the special questions on which his opinion was desired, as well as the general position of the Society, and the course which the Council ought to adopt under existing circumstances, Mr. Colt (who attended as solicitor) was requested to draw up a case in writing embodying the substance of the questions, for the purpose of publication, with the opinion of Mr. Tidd Pratt thereon.

From what transpired during the conference, the Committee were fully satisfied that the Council were bound to carry the Bye-laws into effect without delay, regularly sanctioned and confirmed as they were; and that if they had neglected to do so, because some Members had denied their legality and obtained a legal opinion in some respects at variance with them, they would have incurred serious responsibility.

CASE FOR THE OPINION OF COUNSEL.

HEREWITH are left copies of the Charter of Incorporation; of the Bye-laws made in June, 1851, in pursuance of the Charter; of the Act 15th and 16th Vict., c. 56; of Two additional Bye-laws made in November, 1852; and of a general Code of Bye-laws, made in June, 1853.

Upon the *construction of these* documents, *questions have been raised*, and the opinion of Counsel is requested on behalf of the Council of the Society, upon the points hereafter referred to.

1st. Soon after the passing of the Act, an announcement was made by the Council of the Society that candidates applying *before* the 1st of May, 1853, to be examined, with a view of becoming Members or Associates of the Society, would be subjected to a more *lenient Examination* than subsequent applicants. Upwards of 200 persons made application accordingly, and it was arranged by the Council that the Board of Examiners should meet twice or three times during each month, to proceed with their Examination, taking them in rotation, on the understanding *that they should all be entitled to the privilege of the lenient Examination.*

A portion of the applicants above mentioned passed their Examination, and were admitted PRIOR to 1st May, 1853. Between 1st May and the 1st July, 1853, there were no Examinations. A considerable number were not examined *until after* the 1st July, 1853, and *some are still waiting their turn.*

The attention of Counsel is directed to the Bye-laws of June, 1851, section 2; to the Act 15 and 16 Vic., c. 56, sec. 1, to the fact that the *applications* referred to, were made *prior to* the date of the later Bye-laws; to the Bye-laws of June, 1853, sec. 1, Nos. 2, 6, and 7; section 10, Nos. 7, 8, 9, 10, and 11.

Q. The Council desire to be advised whether the date of the applications will justify the Society in placing such of the parties referred to, as were not admitted prior to May, 1853, in the same position with regard to Subscriptions, which they would have occupied if they had passed their Examination, and been admitted before the 1st July, 1853?

A. *I am of opinion that the date of the applications will* not *justify the Society in placing such of the parties referred to, as were not admitted prior to May*, 1853, *in the same position with regard to subscriptions which they would have occupied if they had passed their examination and been admitted before 1st July*, 1853.—J. TIDD PRATT.

2nd. The attention of Counsel is, in the second place, directed to the Bye-laws of November, 1852, No. 1, and to the Bye-laws of June, 1853, sec. 1, Nos. 2 and 7.

In reference to these provisions, it is to be noticed that some of the parties who availed themselves of the first-mentioned Bye-law, were not elected as Members until after the 1st July, 1853, although they applied for admission in due time; also that the amount of the Annual Subscription, although not specified in Bye-law No. 2, is stated in Bye-law No. 7.

Q. The Council desire to be advised whether the persons referred to can now be admitted, subject to the payment of Annual Subscriptions of One Guinea?

A. *I am of opinion that the persons referred to* cannot now *be admitted, subject to the payment of Annual Subscriptions of One Guinea.*—J. TIDD PRATT.

3rd. The attention of Counsel is in the third place directed to the Bye-laws of June, 1851, sec. 1, Nos. 3 and 4; to the Bye-law of November, 1852, Nos. 1 and 2; and to the Act 15th and 16th Vic., c. 56, sec. 1, 2, 5, 6, and 10.

It is to be observed that there is a class of persons who were *neither Associates of the Society prior to the 1st July*, 1842, nor established in business PRIOR to the 18th of February, one thousand eight hundred and *forty-three*, but who applied for admission in conformity with the Bye-law No. 1, of November, one thousand eight hundred and *fifty-two*, and have been elected.

Q. The Council desire to be advised whether these persons have been legally

elected, and whether the Registrar can properly place them upon the register of Pharmaceutical Chemists.

A. *I am of opinion that these persons have been legally elected, and that the Registrar can properly place them upon the register of Pharmaceutical Chemists.*—J. Tidd Pratt.

4th. The attention of Counsel is in the next place directed to the Charter, lines 237, 8, and 9; to the Act 15th and 16th Vic., c. 56, sec. 1; and to the Bye-laws of June, 1853, sec. 6, No. 4.

Q. The Council desire to be advised whether they have the power to remove a Member of the Board of Examiners during the current year for which he was elected, in the event of their considering it advisable so to do?

A. *Under the Bye-laws of June, 1853, sec. 6, No. 4, the Council are to appoint a Board of Examiners for each year; in my opinion, therefore, the Examiners when elected are elected for one year, and though in the Charter, lines 237, 8, and 9, there is power to make a bye-law for filling up any vacancy in case of death, &c.; but, as there is no Bye-law on the subject of removal of officers, &c., the Council have not, I think, the power to remove a Member of the Board of Examiners during the current year for which he was elected, in the event of the Council considering it desirable so to do.*—J. Tidd Pratt.

5th. The attention of Counsel is in the last place directed to the Code of Bye-laws made in June, 1853, and to the confirmation thereof by a Special General Meeting of the Society, and by the Secretary of State. This latter confirmation is in the following form:—

"I hereby certify my confirmation and approval of the annexed Bye-laws, "confirmed and approved at a Special General Meeting of the Pharmaceutical "Society of Great Britain, held on the 11th ult., for the space of one year from "this date, and subject to the decision of a Court of Law upon the legal questions "which have arisen or may arise in reference to any of them.

"*Whitehall, 17th June*, 1853." (Signed) "Palmerston.

It is to be noticed that the validity of these Bye-laws *has been impugned*, and that legal advice has been obtained with a view of *raising certain questions in a Court of Law.*

Q. The Council desire to be advised as to the validity of the Bye-laws of June, one thousand eight hundred and fifty-three, and generally as to the course to be taken in reference thereto under existing circumstances.

A. *By the 15 & 16 Vict., c. 56, § 2, the Council are authorised to make and establish Bye-laws, as they shall deem proper and necessary, for the purposes contemplated by the Charter, or that Act, provided such Bye-laws shall be confirmed and approved by a Special General Meeting of the Members of the Society, and by one of Her Majesty's principal Secretaries of State. I am of opinion that the Bye-laws of June, 1853, confirmed and approved by a Special General Meeting of the Members, and by the Secretary of State for the Home Department, are valid and legal, and should be acted upon by the Society, until they have been set aside by the Court of Queen's Bench. It appears to me, that as the Special General Meeting of the Members confirmed the Bye-laws, without any reference to time, &c., there is no proviso in the Act which authorized the Secretary of State to limit the operation of them for the space of one year, or subject to the opinion of a Court of Law upon any legal question which may have arisen, or may arise, in reference to any of them.*—John Tidd Pratt, *27th Sept.*, 1853.

In consequence of the answer of Mr. Tidd Pratt to the first question, the following circular has been issued for the information of candidates about to present themselves for examination. According to the Bye-laws in force at the time of the applications of the candidates to whom the question refers, they

would have been admissible as Annual Subscribers, namely, Associates half-a-guinea, Members one guinea per annum. The effect of the Bye-laws now in force is to substitute fees for annual subscriptions, and the period at which it was decided that the change should take place was the 1st of July, 1853. As the delay in the examination of the candidates who applied before the 1st of May, arose from circumstances not under their control, the Council made the announcement stated in the first question, and it was understood that the parties would have been subject to the terms and conditions in force at the time of their application. Unforeseen events having interfered with the arrangements contemplated in the Bye-laws, the Council were desirous of carrying out the *spirit* of the regulations by adhering to this understanding. But it appears that the terms of the Bye-laws do not admit of such construction, as it is provided that the examination must precede the admission, and those who were not examined prior to July 1st cannot be dealt with as persons admitted prior to that date. The Board of Examiners, however, have decided to meet the requirements of such cases by granting a reasonable indulgence with regard to the time of paying the fees, which in other cases are payable on the day of examination.

Pharmaceutical Society of Great Britain, 17, *Bloomsbury Square.*

Sir,—Some candidates having had their names placed on the List for Examination before the 1st of May, under the impression that they would be admissible as Members or Associates on payment of *annual subscriptions*, according to the Bye-laws of that time, I beg to inform you that the new Bye-laws having come in force, the fees enumerated in the enclosed statement must, in future, be substituted for annual subscriptions, except in the cases of persons who were connected with the Society as Members, Associates, or Registered Apprentices or Students, prior to the 1st of July, 1853.

I am, Sir, your obedient servant,

George W. Smith, Secretary.

FEES PAYABLE ON EXAMINATION AND REGISTRATION.

The Classical Examination and Registration as an Apprentice or Student	Two Guineas.
The Minor Examination, and Registration as an Assistant	Three Guineas.
Or if not a Registered Apprentice	Five Guineas.
The Major Examination, and Registration as a Pharmaceutical Chemist	Five Guineas.
Or if not a Registered Assistant	Ten Guineas.

Registered Apprentices or Students enjoy the same privileges as Associates.

Registered Assistants are admitted as Associates without any additional payment.

Registered Pharmaceutical Chemists, on commencing business, are eligible for election as Life Members of the Society on payment of the sum of five guineas.

N.B.—Associates and Registered Apprentices or Students, who were such prior to the 1st of July, 1853, are subject to the following regulations, their annual subscriptions being in lieu of the fees payable on examination and registration by persons not connected with the Society before that date.

BYE-LAWS, SEC. 1.

"Associates, being such prior to the 1st day of July, 1853, shall pay the annual subscription of 10*s.* 6*d.*

"Associates, admitted as such prior to the 1st day of July, 1853, shall, upon becoming Members, pay the Annual Subscription of one guinea, or in lieu thereof the sum of ten guineas as a Life Member's subscription.

"Registered Apprentices and Students, being such prior to the 1st day of July, 1853, shall pay the annual subscription of 10*s.* 6*d.*

"Registered Apprentices or Students, admitted as such prior to the 1st day of July, 1853, shall, upon becoming Members, be subject to the same conditions as Associates admitted before that date."

AT A MEETING OF THE COUNCIL,

Held on the 5th October—

The President reported, that in consequence of the circumstances which had

transpired subsequently to the meeting of the Council on the 7th September, the Committee appointed on that day had thought it advisable to delay the communication to Mr. Dickinson, and refer the matter for the further consideration of the Council.

In accordance with Bye-law, sec. 17, clause 1, it was resolved—

"That William Dickinson be called upon to explain his conduct as a Member of the Council in his systematic opposition to its decisions, and his endeavours to obstruct the business of the Society by joining in a hostile appeal to the Secretary of State in defiance of the provisions of the Charter, line 96 to 101."

("At all General Meetings and Meetings of the Council the majority of the Members present, having a right to vote thereat respectively, shall decide upon the matters propounded to such Meetings; the person presiding therein having, in case of an equality of numbers, a second or casting vote.")

"The explanation of Mr. Dickinson is also required with regard to the following passages, published in the periodical entitled the *Annals of Pharmacy*, edited by William Bastick and William Dickinson."

(The passages referred to were read by the Chairman, and published in the Report of the Special General Meeting, in the Pharm. Journ. for October.)

In accordance with Bye-law, sec. 17, clause 2, it was resolved—

That the Secretary do communicate with Mr. William Bastick, requiring his explanation, as a Member of the Society, of the passages before referred to in the periodical of which he is one of the editors.

PHARMACEUTICAL MEETING.

Wednesday, October 12, 1853.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM,

RECEIVED SINCE THE LAST MEETING.

To the Library:—

Examination of Pavon's Collection of Peruvian Barks contained in the British Museum, from the Author, Mr. J. E. Howard.

Motherby's *Medical Dictionary*, from Mr. W. H. Bucklee.

Vol. I. of Boyle's *Works*, from Mr. Bartlett, Chelsea.

Werner's *External Characters of Minerals*, from Mr. Allchin.

Four Volumes and some Numbers of the *American Journal of Pharmacy*, from Mr. Wm. Procter, Philadelphia.

Nos. 21 and 22 of the *Quarterly Journal of the Chemical Society*, from the Society.

Nos. 12 and 13 of the *Insurance Magazine*, from the Institute of Actuaries.

Journal of the Photographic Society from the commencement. From the Society.

Literary Gazette, regularly received from the Publisher.

To the Museum:—

Products of the Shale Manufacture, from Mr. Bowerbank.

Sumatra Coffee-Leaves, and a Packet of Chalk from China. From Mr. Daniel Hanbury.

Specimens of Socotra Aloes and Dragon's Blood, Copal and Mecca Balsam. From Dr. Vaughan.

Cedron Seeds (Simaba Cedron). From Mr. Squire.

Paraffine, obtained from Turf and Peat. From Mr. Wonfor.

Portland Arrow-Root, and Corms of Arum Maculatum, from the Island of Portland. From Mr. S. B. Groves.

Fresh Corms of Curcuma Longa. From Mr. J. Maully, of Stretford.

Specimen of Disulphate of Quinine, prepared by a patent process, by Mr. E. Herring.

A Bundle of Kousso as imported. From Mr. H. Deane.

Juniper Tar Oil, or Pyroligneous Oil of Juniper. From Mr. Jacob Bell.

Models of the most important varieties of Starch Granules, showing their relative sizes and appearance when viewed by the microscope, both by ordinary and polarized light. Presented by Mr. Bell from the collection of the late Dr. Pereira.

It was resolved that the Thanks of the Meeting be given for the above Donations.

DISTRIBUTION OF PRIZES.

The Prizes awarded to the successful competitors at the Examinations in the classes of Chemistry and Pharmacy, and Botany, and the Natural History of Drugs, at the conclusion of the last session, were distributed as follows:—

CHEMISTRY AND PHARMACY.

EXAMINER, MR. REDWOOD.

First Prize.....Mr. Alfred Harnett.
Second.....Mr. David Williamson.
Certificates of Merit...
1. Mr. J. R. S. Clifford.
2. Mr. R. J. W. Orton.
3. Mr. Henry Steele.

Questions for Examination:—

1. What are the experimental data required for the determination, by calculation, of the specific gravity of a body? What is the difference in grains between the ounce and pound avoirdupois, and the ounce and pound troy weight? What is the weight in grains of a fluid-ounce of distilled water?
2. What is the meaning of the terms *specific heat* and *latent heat*, and how are the specific heat and the latent heat of bodies determined? Explain the difference between the conduction of heat and the transmission of heat, and illustrate the respective phenomena by examples.
3. Explain the construction and the principle of the hydraulic press.
4. Explain the cause of the opalescent appearance of solution of sulphate of quinine.
5. What are the theories generally received among Chemists of the constitution of salts?
6. Describe the processes for preparing chlorine, carbonic oxide, iodic acid, and hydriodic acid.
7. State the composition of alcohol, aldehyde, chloral, chloroform, and valerianic acid.
8. Describe the preparation of ether by what is called the continuous process. State the conditions essential to its success, and explain the phenomena of etherification.
9. Describe some of the methods by which organic bases or alkaloids have been produced by artificial means.

BOTANY AND THE NATURAL HISTORY OF DRUGS.

EXAMINER, MR. BENTLEY.

Prizes Equal.....
Mr. Henry Church.
Mr. A. K. Dyer.
Certificates of Merit...
1. Mr. John D'Oyle.
2. Mr. J. R. S. Clifford.
3. Mr. David Williamson.

Questions for Examination:—

1. Describe the process of Cell-development according to the respective theories of Schleiden and Mohl, and state the opinions entertained with regard to their applicability in the different parts of plants.
2. Describe the structure of Exogenous stems, and state briefly the characteristic distinctions between the stems of Acotoledonous, Monocotoledonous, and Dicotyledonous plants.
3. What are the substances required as food by plants? Explain how the food is taken up by them.
4. Give a definition of the following terms:—Involucra, Spathe, Cupule, Raceme, Spadix, Umbel, Cyme, Legume, Cremocarp, Capsule, Siliqua, and Cone.

5. Describe the structure of the Ovule, and explain the manner in which Fertilization takes place.
6. Give the essential characters of the natural orders, *Papaveraceæ*, *Leguminosæ*, *Umbelliferæ*, *Solanaceæ*, *Euphorbiaceæ*, and *Melanthaceæ*. Enumerate the officinal substances which these orders respectively yield.
7. Give a botanical description of the natural order *Smilaceæ*. State the distinctive characters of the Mealy and Non-Mealy Sarsaparillas; also classify the commercial sorts of Sarsaparilla, and describe the characters by which they are distinguished.
8. What are the physical characters of Russian, East Indian, and Dutch-trimmed Rhubarbs? Give their supposed botanical and geographical sources.
9. Name the barks numbered respectively 1, 2, 3, and state their characteristic physical characters.
10. What are the characters by which Laurel camphor may be distinguished both from Dryobalanops camphor and Artificial camphor.
11. Distinguish the *Rubiaceæ* from the *Cinchonaceæ*, and the *Campanulaceæ* from the *Lobeliaceæ*.
12. To what natural orders would plants possessing the following characters belong?
    a. Sepals and petals 5 each. Stamens 10, hypogynous. Carpels 5. Fruit with a long beak round which the ripe carpels are arranged.
    b. Sepals, petals, and stamens 4 or 5 each. Carpels united into a superior, 1-celled, many-seeded pistil, with parietal placentæ. Leaves ribbed and opposite.

Besides the above questions, the candidates were also examined as to their practical knowledge of plants, by having submitted to them 30 specimens, which they were required to name, to mention the natural orders, and to answer any further questions connected with the subject.

The Chairman observed that the Society's medal was nearly completed, and had been by one of the candidates selected in preference to books. The prizes had been well earned, and he hoped there would be a good competition for the medals in future to be awarded.

ON THE USE OF COFFEE-LEAVES IN SUMATRA.

BY DANIEL HANBURY.

The existence of caffeine in the leaves as well as in the berries of the coffee-plant has attracted some attention, and a project for substituting them for those of the tea-plant has been actually devised by Dr. John Gardner, of London. According to this gentleman the leaves require to be subjected to a certain process of preparation before they are used. What this process is I am unable to state; but specimens of the prepared coffee-leaves were placed by Dr. Gardner in the Great Exhibition of 1851, together with the caffeine extracted from them, since which time advertisements have appeared in the Ceylon papers soliciting tenders for the supply of coffee-leaves by the ton.

Whether these advertisements have met with a response I know not, but in March last my attention was drawn to a letter signed "*An Old Sumatran*," published in the *Overland Singapore Free Press* for Jan. 3, 1853. This letter, which was reprinted in the Pharmaceutical Journal for March (vol. xii., p. 443), states, that on the western side of the island of Sumatra an infusion of torrified coffee-leaves is of universal consumption among the inhabitants, so much so indeed, as to be regarded as one of the very few necessaries of life.*

Upon applying to the writer of this letter, who proved to be N. M. Ward, Esq., of Padang, I speedily received the following more detailed communication,

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* This employment of coffee-leaves was not previously unnoticed. Brande in his *Manual of Chemistry* (Lond. 1848, vol. ii., p. 1616), briefly states that the leaves of the coffee-plant are used in Java and Sumatra as a substitute for tea, and that it is probable they contain *theine*.

since which a box of prepared Sumatran coffee-leaves, kindly forwarded by him, has reached my hands:

"*Padang*, 15*th May*, 1853.

"Dear Sir,—It is not without satisfaction that I learn that the notice inserted in the *Singapore Free Press* on the use of the Coffee-leaf in Sumatra, has attracted attention, and obtained increased publicity through the medium of the *Pharmaceutical Journal*. Although long aware of its value as an article of diet among the natives here, it never occurred to me that it might be introduced successfully as such at home, until I learnt from the *Free Press* that a patent had been taken out by Dr. Gardner. It then struck me that as its adoption in Europe would unquestionably be attended with important advantages to the labouring classes, a knowledge of the fact of its general use here might be of service, by giving that confidence in it which must necessarily be wanting to a new and untried article. The fact of it being the only beverage of a whole population, and of it having from its nutritive qualities become an important necessary of life, will be a sufficient guarantee of its safety as an article of diet, and of its freedom from deleterious effects.

"The natives have a prejudice against the use of water as a beverage, asserting that it does not quench thirst or afford the strength and support the coffee-leaf does. With a little boiled rice and infusion of the coffee-leaf, a man will support the labours of the field in rice-planting for days and weeks successively, up to the knees in mud, under a burning sun or drenching rains, which he could not do by the use of simple water, or by the aid of spirituous or fermented liquors. I have had opportunity of observing for twenty years the comparative use of the coffee-leaf in one class of natives, and of spirituous liquors in another, the native Sumatrans using the former, and the natives of British India settled here the latter, and I find that while the former expose themselves with impunity for any period to every degree of heat, cold, and wet, the latter can endure neither wet nor cold for even a short period, without danger to their health.

"Engaged myself in agriculture, and being in consequence much exposed to the weather, I was induced several years ago, from an occasional use of the coffee-leaf, to adopt it as a daily beverage, and my constant practice has been to take a couple of cups of strong infusion with milk in the evening, as a restorative after the business of the day. I find from it immediate relief from hunger and fatigue, the bodily strength increased, and the mind left for the evening clear and in full possession of all its faculties. On its first use, and when the leaf has not been sufficiently roasted, it is said to produce *vigilance*, but I am inclined to think that where this is the case, it is rather by adding strength and activity to the mental faculties, than by inducing nervous excitement. I do not recollect this effect on myself except once, and that was when the leaf was insufficiently roasted.

* * * * *

"As a beverage the natives universally prefer the leaf to the berry, giving as a reason that it contains more of the bitter principle and is more nutritious. They are not unacquainted with the extract in a half solid form obtained by decoction, but in the lowlands I am not aware that they apply it to any particular purpose. The roasted leaf used to form an article of trade betwixt the coffee districts of the interior and the lowlands of the coast, but since the government monopolized the produce, this trade has in a great measure ceased, the natives believing the sale of the leaf as well as that of the berry, forbidden. In the lowlands, coffee is not planted for the berry, being not sufficiently productive; but the people plant about their houses for the leaf for their own use, not however to the extent of the demand, so that in the settlement of Padang they are obliged to have recourse to the berry mixed with a portion of burnt rice, without which the beverage would be too dear for them. It is an undoubted fact, however, that everywhere they prefer the leaf to the berry.

"The muster I have the pleasure to send, is the produce of my own ground, properly prepared by a native well acquainted with the process. The best mode of roasting, he says, is by holding the leaves over the clear flame of a fire made of dry bamboo. The fireplace should be circular, of brick or other material, two feet deep, two feet in diameter at bottom inside, and one-and-a-half at top, with a small door-place on one side for introducing the fuel. The reason for using bamboo as fuel is, that it produces but little smoke, and *that* little containing no creosote, does not adhere to

the leaf. When sufficiently roasted as described in the *Singapore Free Press*, the leaves have a brownish buff colour, and are then separated from the stalks, which are arranged in the slit of a stick afresh and roasted by themselves. The natives pound the whole of these roasted stalks in a mortar and mix them with the leaf for sale; but as the bark only contains extract, it is better to rub off this betwixt the hands and to reject the wood.

* * * * *

"I have already remarked that whilst the culture of the coffee-plant for its fruit, is limited to particular soils and elevated climates it may be grown for the leaf, wherever within the tropics the soil is sufficiently fertile. This extensive habitat, if I may so term it, added to its nutritive qualities and freedom from deleterious principles, points it out as the best adapted of all the productions affording caffeine for general consumption; and if it should turn out that the article can be sent to distant countries without deterioration, I shall have every confidence in its ultimate adoption for general use.

"The price here of the leaves prepared for use, is generally about 1½*d.* a pound; and I suppose it may be prepared and packed for the European market of good quality for 2*d.*, affording sufficient profit to the planter and bringing it within reach of the poorest classes of Europe."

Such is Mr. Ward's communication. The sample which he has sent arrived in excellent condition and appears to have been very carefully prepared. It consists of tolerably regular fragments of shining leaves mixed with pieces of stalk. Its colour is deep brown; its odour somewhat like that of a mixture of coffee and tea, and extremely fragrant. Immersed in boiling water a transparent, brown infusion is obtained, which when made sufficiently strong, forms, with the addition of sugar and milk, a beverage by no means unpalatable.

Caffeine, as is well known, is a crystallizable, nitrogenized, vegetable principle,† existing in the berries of the coffee shrub, in the leaves of the tea-plant of China, in the *Yerba de Maté* or Paraguay Tea of South America, and, as MM. Berthemot and Dechastelus have proved,‡ in *Guarana*, the basis of a favourite beverage in some parts of Brazil. The plants affording these productions occupy very different positions in the vegetable kingdom; the coffee-plant belongs to the natural order *Rubiaceæ*, the tea-plant to *Camellieæ*, the Paraguay Tea (*Ilex Paraguariensis*, St. Hil.) to the *Ilicineæ* and the Guarana-plant (*Paullinia sorbilis*, Mart.) to *Sapindaceæ*.

It is not a little remarkable that Caffeine has hitherto been detectedonl yin plants which are broadly distinguished from each other in their botanical characters; but it is yet more extraordinary that these plants should have been *independently* selected as articles of diet by semi-barbarous nations inhabiting widely-separated portions of the globe.

The Chairman considered the subject referred to in Mr. Hanbury's paper of great importance. In the cultivation of Coffee, as at present conducted, the crop was frequently lost in consequence of the attacks of a small insect, a coccus, the effects of which would probably not prevent the collection of the leaves of the plant.

SULPHATE OF QUININE.

A brief statement of a process which has been recently patented by Mr Edward Herring, for the manufacture of Sulphate of Quinine, was communicated to the meeting.

The first part of the process consists in treating the bark with a boiling caustic alkali. The powdered bark is boiled with a solution of caustic soda or potash, and then pressed and washed with water until the whole of the colouring

† Its composition is expressed by the formula $C_8\ H_5\ N^2\ O^2$. *Theine* and *Guaranine* are identical with *Caffeine*.

‡ *Journ. de Pharm.* (Aug. 1840). Tome xxvi., p. 518.

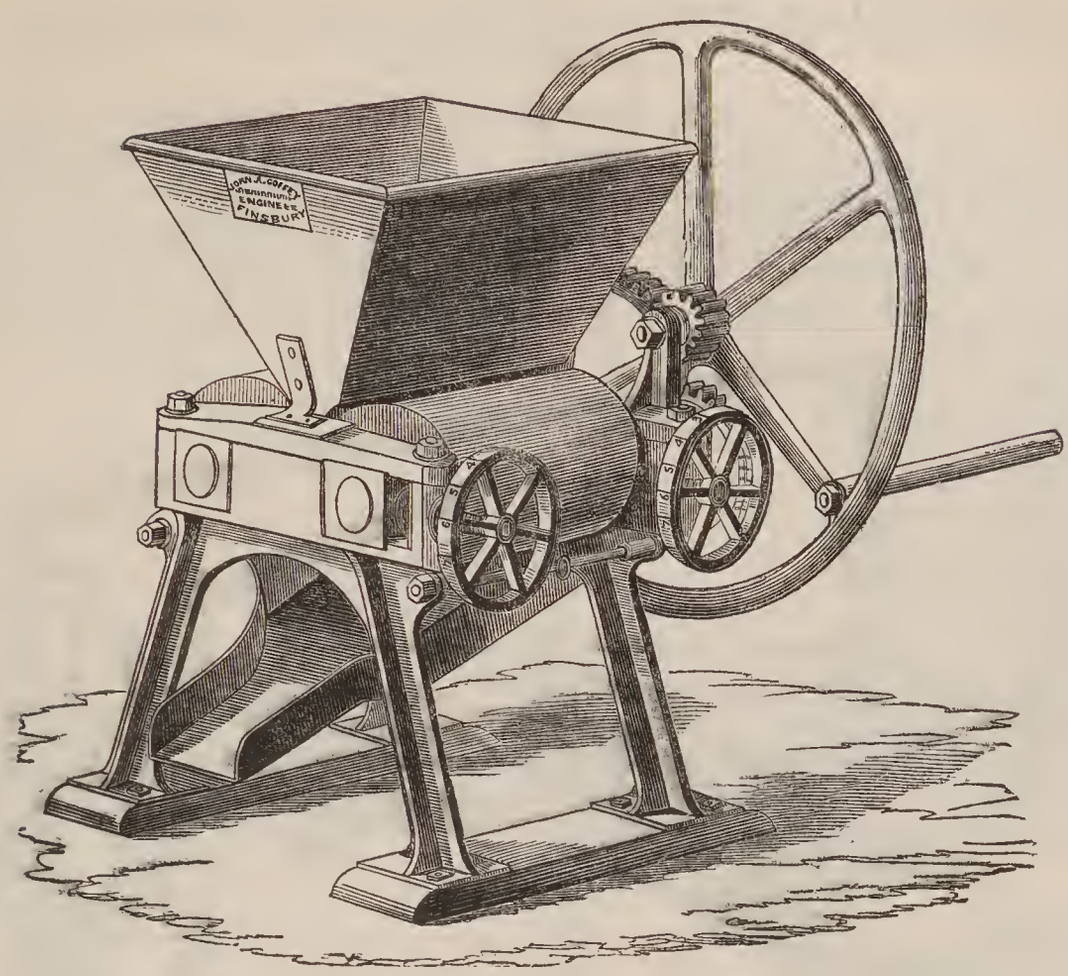
matter of the bark has been removed. After being thus treated, the bark, which has been deprived of its colouring matter, retains the greater part of the alkaloids in an uncombined state. The blood-red alkaline liquors resulting from the boiling and washings, which contain a small quantity of quinine, are retained for subsequent treatment. The bark is, in the next place, boiled with dilute sulphuric acid, so as completely to exhaust it of the alkaloids. The liquor is concentrated, filtered, and precipitated with solution of caustic soda or potash. The precipitated alkaloids are combined with sulphuric acid, and the sulphates of quinine, quinidine, and cinchonine are separated from each other by repeated crystallization, and previously to the last crystallization are decolourized with pure animal charcoal.

The blood-red alkaline liquors, referred to above, are treated in the following manner :—Muriatic acid is added so as to render them acid; they are then filtered, and precipitated with slaked lime. This precipitate is washed, pressed, dried, and powdered. The alkaloids contained in this precipitate are dissolved out with benzole, and the solution in this menstruum is agitated with dilute sulphuric acid, by which the alkaloids are transferred to the latter, which is afterwards separated by decantation. This acid solution is precipitated with caustic soda or potash, and the alkaloids are treated as described in the former part of the process.

The sample of sulphate of quinine made by this process, which was on the table, was accompanied by a sample from each of the several manufacturers both English and foreign. They comprised three English, three German, two French, three Italian, and two American.

MACHINE FOR CRUSHING HERBS AND ROOTS.

Mr. Jacob Bell directed the attention of the meeting to a crushing machine which had lately been made by Mr. Coffey. He observed that the most effectual mode of crushing herbs (such as hyoscyamus, &c.) for extract was by means of the stones of a drug-mill, which, however, did the work so effectually that there was reason to believe the amount of the product was increased by a portion of the vegetable fibre being reduced to a fine pulp and pressed out with the juice. Those who sent their herbs to a mill to be crushed suffered the inconvenience of delay in the process, which was objectionable, as the juice ought to be evaporated as soon as expressed. He had tried several experiments with a view of obtaining a substitute for a drug-mill. One of these had a pair of mill-stones about two feet six in diameter, working on a flat stone, and turned by hand. This did not answer, as the stones were not heavy enough to crush the harder portions of the plant, and the labour of working the machine by hand was too great. Another machine was contrived having two cylinders, between which the herbs were crushed. As there was no contrivance for approximating the cylinders according to circumstances, this did not answer, as some portions of the herbs or roots passed through without being crushed, while other portions would not pass at all. By the assistance of Mr. Coffey he was now able to describe to the meeting a machine which, although probably capable of some improvement, was the best he had seen. It had a contrivance by which the cylinders could be brought nearer to each other or further apart by an adjusting screw; and in crushing taraxacum, for example, it might be passed through twice or three times, the cylinders being nearer together each time, until it was sufficiently bruised. The cylinders were of cast iron, but might be made of gun metal, or of a hard wood. Considerable force was required to turn the wheel, which was the chief defect in the machine, but two or three persons could assist in turning it, or it might be adapted to a steam-engine. It had been used for crushing taraxacum, hyoscyamus, conium, and other herbs.



DESCRIPTION.

THE cut partly represents it in section and elevation.

A A a pair of rollers, which, by revolving towards each other, and being of a sufficient diameter, effectually draw the substance through.

B B regulating wheels which communicate to rollers, by which they can be closed or opened with the greatest exactness.

C hopper.

D receiver for juice and crushed material.

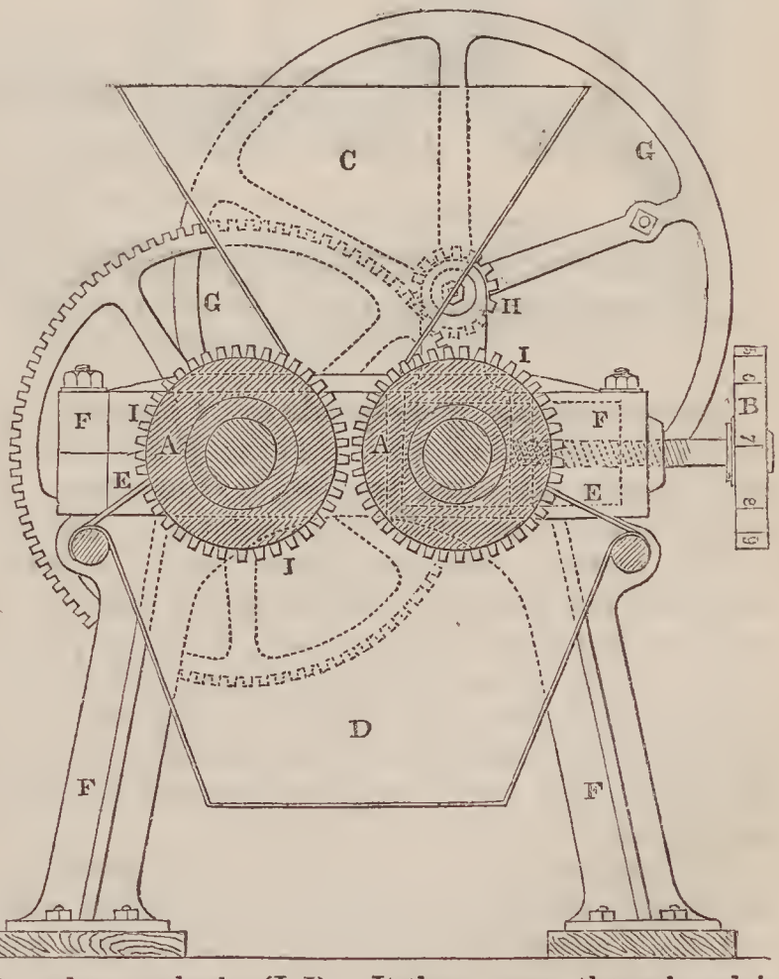
E E scrapers for rollers.

F F cast iron frame.

G fly wheel with handle.

H spur wheel.

I I cog wheels and rollers.



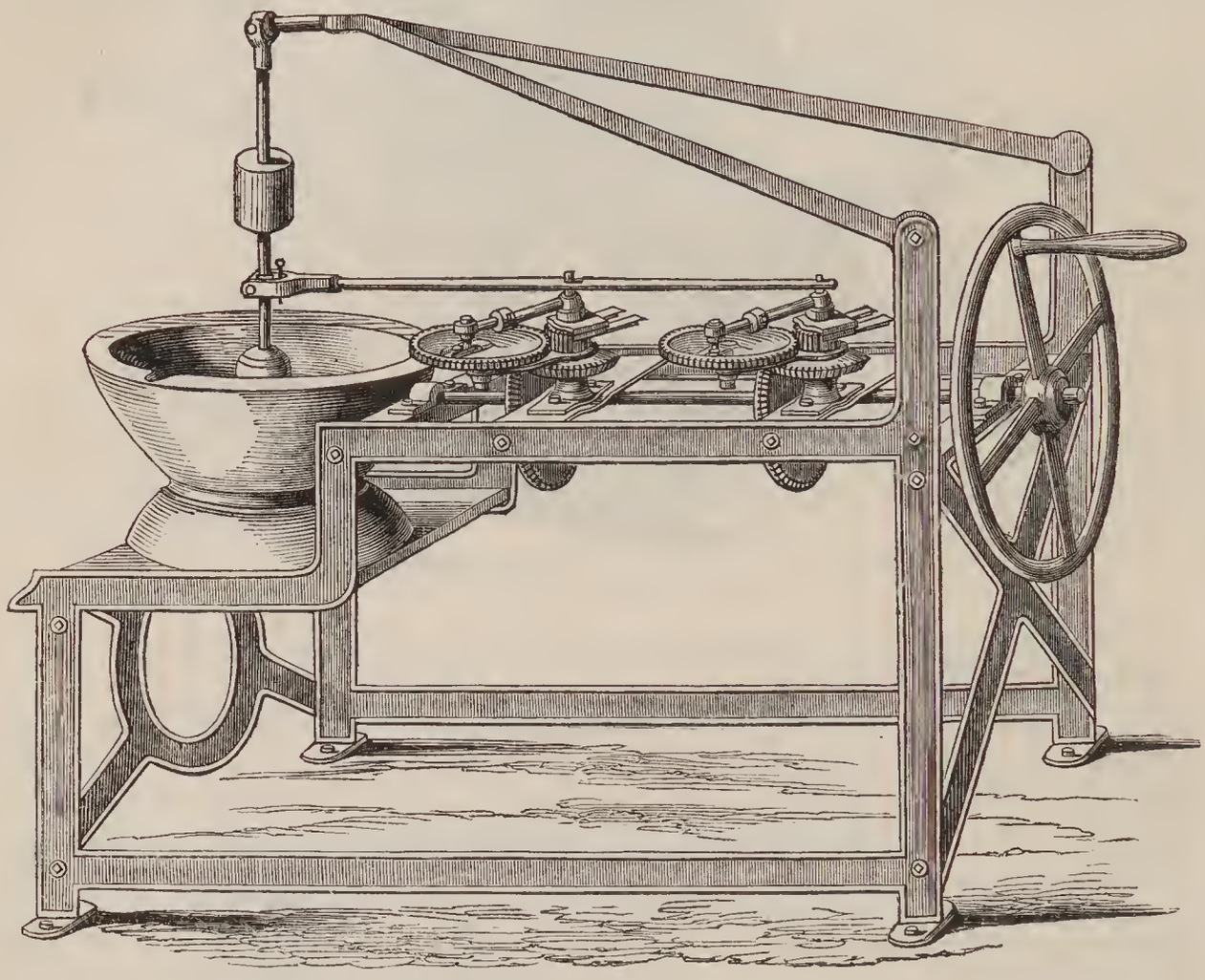
MODE OF OPERATION.

The material being ready (which, if stalky, must be passed through twice, the rollers (A A) being in that case somewhat widened for first passage) is put into hopper (C), taking care not to put too much, but feed carefully. The fly wheel (G) is then put in motion by a handle which communicates motion to rollers (A A) by spur (H) and cog wheels (I I). It then passes through and is caught in receiver (D) a complete pulp.

Note.—By having two sets of rollers, one over the other, the top being of course widened somewhat more then the bottom pair, the material can be crushed effectually by one operation.

GOODALL'S PATENT GRINDING AND LEVIGATING APPARATUS.

Mr. H. Goodall, of No. 5, Peter Street, Derby, brought under the notice of the meeting an apparatus, for which he has recently taken out a patent, for facilitating the operation of powdering drugs on the small scale. This invention consists in a novel and improved arrangement of machinery, whereby the operations of grinding or levigating various substances may be performed by the aid of a pestle, instead of by means of rollers or flat grinding surfaces.



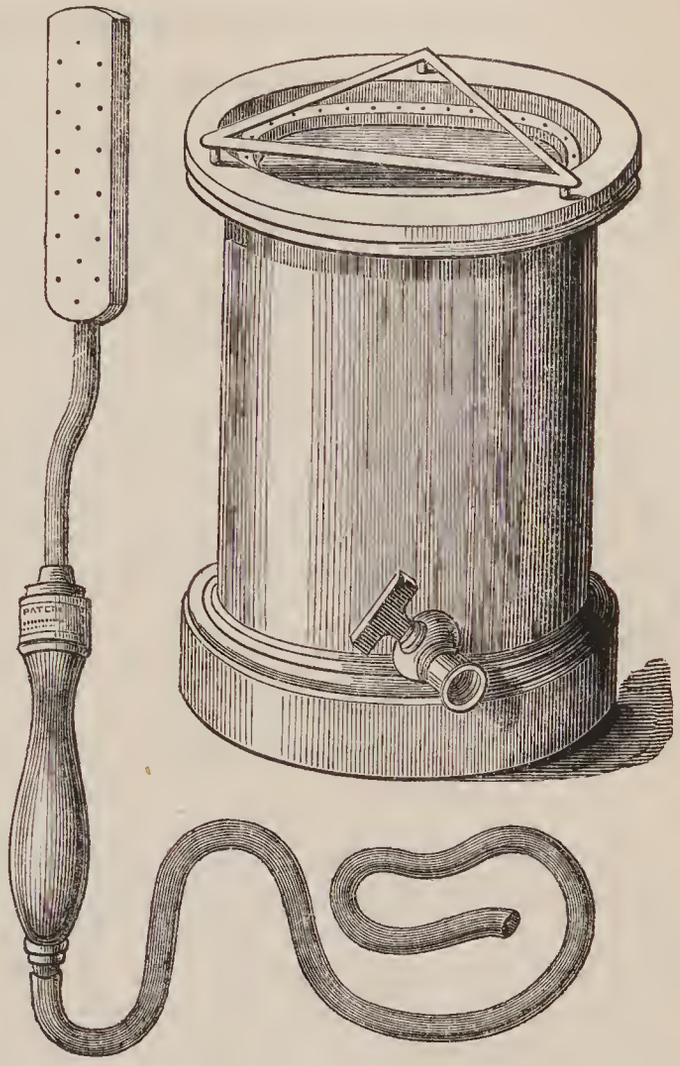
The substances or materials to be operated upon are placed in the mortar, in which the pestle is made to work by mechanical means, in such a manner as to give exactly the same motion as is imparted thereto by hand, when substances are ground, or pulverized in a mortar by manual labour.

The pestle is secured at the top by a lever to which any weight may be applied; the gearing for working the same is driven by means of bevel-toothed gear, on the main driving shaft, which is provided with a winch handle. The mortar being placed in front of the machinery, removes the possibility of dirt from the friction of the wheels falling into it; hence it will be found of great advantage for all kinds of salts, choice colours, mercurial preparations, printers' ink, &c. The pestle may be removed by simply taking out a screw from the driving shaft.

The amount of labour saved is considerable, as the hardest and most difficult substances may be ground by this machine worked by hand as effectually as by the most powerful machinery. On a large scale, driven by steam, it will be found to do more work with less power, than any mill hitherto erected. The pestle traversing over a different surface every time, removes the necessity of scrapers to keep the articles constantly acted upon.

Amongst the articles which are readily ground by it may be mentioned ginger, mustard, salts of all kinds, cream of tartar, sugar, cocoa, pepper, spices, jalap, rhubarb, gums, aloes, barks, mercurial preparations, paints; and for mixing or kneading lozenges, pills, glaziers' putty, bread, biscuits, &c.

BOGGETT'S PATENT GAS SPATULA AND PORTABLE FURNACE.



The Spatula has a tube, passing through the handle and terminating in the blade, by which gas is conveyed to the latter. The gas escapes through small holes in the upper surface of the blade, and on being ignited the flame communicates heat by conduction to the lower surface. A piece of vulcanized India-rubber tubing connects the end of the handle with a gas pipe furnished with a stop-cock, by which the size of the flame and at the same time the heat of the spatula can be regulated. The flexible tube admits of perfect freedom of motion in the use of the spatula for spreading plasters. When not used for this purpose the spatula is placed in a groove near the top of the little portable furnace, where it serves as a gas-burner for heating any vessel placed over the furnace. There is also another circular burner in the furnace, with a separate supply of gas, so as to increase its heating power when required. Mr. Edwards, of Poland Street, is the maker, and Mr. Swaine, 29, Church Terrace, Camden Town, the agent, for their sale.

NICKEL'S PATENT ELASTIC PLASTER.

Specimens of a new sort of plaster were brought under the notice of the meeting by Mr. Benjamin Nickels, of 9, Camberwell Green, Surrey, the patentee. The following is the description of the plaster, furnished by the patentee:

The invention of this plaster has for its object the application of elastic fabrics, such as are made in warp or stocking machinery, so that the plaster may stretch and assume the shape of the parts to be covered. Such looped or knit fabrics are spread, or impregnated with like materials to those heretofore employed when non-elastic fabrics, or paper, or leather, have been used in preparing adhesive plasters for medical and surgical purposes.

It allows a free expansion and contraction of the muscles and circulation, requiring no exterior bandaging, and may be used as a tight strapping at the will of the operator. It is particularly applicable to wounds and sores on the face and hands, and may be moulded to, or laid on any prominency, cavity, or tabulated parts, so as to fit even as the skin. It may be had white or tinted to any colour, and the fabrics can be made of cotton, linen, or silk, of any strength or substance required.

Mr. A. Ure said he was glad to find that Mr. Nickels had directed his attention to the subject of plasters. He liked the appearance of that before the meeting, and would be happy to give it a fair trial at St. Mary's Hospital.

THE PEREIRA MEMOIRAL,

IN CONNECTION WITH THE PHARMACEUTICAL SOCIETY.

At a meeting of the Committee held at 17, Bloomsbury Square, Oct. 21st,

MR. HENRY DEANE IN THE CHAIR,

the Secretary reported subscriptions * amounting to £12 10*s.* 6*d.* received since the publication of the last list, making the total amount received £170 10*s.* 6*d.*

It was resolved, That application be made to Mr. Wyon for an estimate of the cost of a die the size of the one now in process of execution for the Pharmaceutical Society; and also one of a smaller size, with the cost of medals in gold, silver, or bronze respectively:

That it is the opinion of this Committee that the Pereira Medal should be only in silver and gold:

That the Local Secretaries of the Pharmaceutical Society be requested to continue their efforts to obtain additions to the List of Subscribers; and that the resolutions passed at this meeting be published in the Transactions of the Society for the present month.

That the Committee adjourn until Tuesday evening, at eight o'clock:

ADJOURNED MEETING, *October 28th*.

MR. H. DEANE IN THE CHAIR.

Mr. Wyon's estimate of the cost of dies of several sizes, with specimens, having been laid before the Committee and considered—it was resolved, that the specimen, the diameter of which is 2½-inches, be selected, the cost of the die being £84, and that Mr. Wyon be requested to proceed with the execution of the work. The following Resolutions were passed unanimously:—

The Committee recommend that the competition for the Silver Pereira Medal be confined to Students and Associates of the Pharmaceutical Society. That the Gold Pereira Medal be awarded for important original investigations or discoveries in Materia Medica; and that it be open to universal competition.

That the Pereira Medals be awarded by the Council of the Pharmaceutical Society, under such regulations as they may from time to time consider expedient.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

It has been arranged, that the regular Meetings of the Board of Examiners for Scotland will take place in the rooms of the Society, 72, Princes Street, Edinburgh, until further notice, on the Second Wednesday of the months of January, April, July, and October, at eleven o'clock, A.M.

Candidates desirous of coming-up for examination, are requested to give notice not later than the first day of each of the above named months, to the Secretary in Edinburgh, to whom the requisite testimonials or certificates should be forwarded at the same time.

Edinburgh, October, 1853. John Mackay, *Secretary*.

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* The List of Names will be found on the cover of this Journal.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE SPONTANEOUS DECOMPOSITION OF XYLOIDINE.

BY J. H. GLADSTONE, PH. D., F. R. S.

Whilst investigating "the chemical history of gun-cotton and xyloidine," and whilst studying abroad, I prepared a number of samples of the different products of the action of nitric acid on cotton, starch, gum, sugar, &c. Most of these decomposed spontaneously in the process of time; and in the Pharmaceutical Journal for March, 1852, I described what had taken place with each.

There was one rather large sample of ordinary starch xyloidine, however, which had then suffered no change; it had been made by treating arrowroot with nitric acid of spec. grav. 1.5, and precipitating and washing with water. After remaining about six years unaltered, this specimen suddenly began to give off gases, and in a few weeks time nothing remained of the original xyloidine, but in its place a light brown viscid liquid. The evolved gases were slightly coloured from the presence of nitric oxide; there was a smell of hydrocyanic acid, accompanied by a very peculiar odour, which I have generally, if not universally, observed in decomposing nitric acid substitution products of this character. The presence of prussic acid in considerable quantity was established by the usual tests. The viscid mass was readily dissolved in water, but was only partially soluble in alcohol. It was strongly acid from the presence of nitric acid in abundance, and from certain organic substances which had a slightly acid reaction. These latter were thrown down from the aqueous solution upon the addition of lime-water, as a flocculent white precipitate which was found to contain no oxalic acid, or at most only a trace; but to consist of one or more azotized principles, which gave flocculent precipitates with silver and lead salts, that were insoluble in acetic acid, but did not give a precipitate with earthy salts until made distinctly alkaline; the same appeared equally true in respect to most metallic salts; copper gave a dark green, and sesquioxide of iron a deep red solution. This acid, as obtained from the lead salt, was found to impart but a faint red colour to blue litmus; it came out brown and non-crystalline on evaporation; and the same may be said also of its potash salt, which indeed might be precipitated from an aqueous solution by the addition of spirit of wine. The liquid filtered from the lime-salt mentioned above, had the excess of earthy base removed by carbonic acid. It reacted alkaline from the presence of a small quantity of ammonia, or at least some volatile alkali, and had a very bitter taste. Nothing crystalline separated on evaporation; but the solution was found to contain beside some bitter principle a quantity of gum, and another substance which gave the ordinary reactions of starch-sugar, when tested with boiling potash, or with an alkaline solution of sulphate of copper.

We may suppose that the decomposition of this sample of starch xyloidine has taken place in somewhat of the following manner. Some of the NO_4 has split up into nitric oxide and nitric acid, whilst a small portion of the nitrogen has combined, as might be expected, with some of the hydrogen of the compound to form ammonia, and a larger quantity has combined with carbon and hydrogen to form prussic acid. During this process oxygen must have been liberated, which may possibly have escaped as such, or combining with carbon have passed off as carbonic acid, or it may have been consumed in the formation of the slightly acid principle, which has been described as found in considerable quantity among the resulting solids. Whether the ammonia and the nitrous fumes have reacted upon one another with the formation of nitrogen gas and water, I know not.

The separation of so much carbon in the form of cyanogen must be looked upon as the principal cause of so much water being produced, for the viscid mass is essentially a strong aqueous solution of the organic bodies. A very large

portion of the starch freed from its combined nitric acid, has remained in a gummy condition, perhaps as dextrine, though it was certainly not of the variety colourable by iodine; whilst the change had advanced farther with another portion, and it was converted into sugar. These substances with traces of a bitter principle, and of a singular odoriferous substance, were the only products of decomposition, at least as far as I could detect.

ON THE DISCOVERY OF QUININE AND QUINIDINE IN THE URINE OF PATIENTS UNDER MEDICAL TREATMENT WITH THE SALTS OF THESE MIXED ALKALOIDS.

BY W. BIRD HERAPATH, M. D.

(Communicated by the Author.)

It has long been a favourite subject of inquiry with the professional man to trace the course of remedies in the system of the patient under his care, and to know what has become of the various substances which he might have administered during the treatment of the disease. Whilst some of these remedies have been proved to exert a chemical change upon the circulating medium, and to add some of their elements to the blood for the permanent benefit of the individual, others, on the contrary, make but a temporary sojourn in the vessels of the body, circulating with the blood for a longer or shorter period, but are eventually expelled and eliminated from it at different outlets and by various glandular apparatus; some of these substances are found to be more or less altered in chemical composition in consequence of having been subjected to the manifold processes of vital chemistry during their transit through the system, whilst others have experienced no alteration in their constitution, but have resisted all the destructive and converting powers of the animal laboratory, and by appropriate means have been again separated from the various excretions by the physiological and pathological Chemist in their pristine state of purity.

It has recently been somewhat more than a subject of conjecture that, in common with several others of the vegetable alkaloids, quinine may be included in this last class of remedial agents, and several methods of discovering its presence have emanated from different scientific observers. It has been repeatedly traced in the urine of patients suffering from intermittent fever, to whom large doses of this substance have been necessarily administered.

The nature of the tests hitherto employed and the various processes adopted require large quantities of the fluid for examination, and the imperfection of the evidence resulting from the experiment still threw considerable doubt upon the value of the conclusions arrived at. It is merely necessary to allude to tannic acid and tincture of iodine as the usual tests employed, both being very far from efficient means of detecting minute quantities of quinine in organic fluids.

Having been struck with the facility of application and the extreme delicacy of the reaction of polarized light, when going through the series of experiments* upon the sulphate of iodo-quinine, I determined upon attempting to bring this method practically into use for the detection of minute quantities of quinine in organic fluids; and after more or less success by different methods of experimenting, I have at length discovered a process by which it is possible to obtain demonstrative evidence of the presence of quinine, even if in quantities not exceeding the $\frac{1}{100,000}$th part of a grain—in fact, in quantities so exceedingly minute, that all other methods would fail in recognizing its existence. The same process with a slight modification has also enabled me to prove the fact, that quinidine escapes from the system by the kidnies in an unaltered state, which, as far as I am aware, has not hitherto been observed, although it might have been almost assumed from the great analogical resemblance existing between these alkaloids.

Chemical examination of the urine of a man suffering from tetanus, in consequence of an injury to the great toe. Amputation was performed at the infirmary by Mr. Morgan. The patient's name was R. Alexander.

The tetanic symptoms were treated by the exhibition of five grains of disulphate

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* Papers published in *Pharmaceutical Journal*, vol. xi., pages 448 and 499, and Analyses of Crystals in ditto, vol. xii, page 6.

of quinine with half a grain of *Cannabis Indica* every three hours; he consequently took forty grains of sulphate of quinine in the period of twenty-four hours.

The urine had a greenish-yellow appearance, and upon standing deposited a brownish-yellow sediment; it was slightly acid, and had a specific gravity of 1.032. The sediment examined by the microscope showed prisms and lozenges of uric acid, with amorphous urate of ammonia.

The deposit treated upon the field of the microscope with ammonia instantly became changed; the crystals of uric acid were rendered more clearly defined in consequence of the amorphous urates being dissolved. The phosphate of ammonia and magnesia was subsequently deposited upon the slide as a cloudy mass, when seen by the unassisted vision, but as a magma of very minute radiating needles when magnified sixty diameters.

The fluid urine was carefully decanted from the amorphous and crystalline deposit.

A. Half-a-pint of this urine was treated with liquor potassæ until decidedly alkaline; it was then repeatedly agitated with pure washed æther; the æthereal solution having been allowed to separate by twelve hours' repose, was carefully removed by a pipette, and then transferred to a counterpoised glass tube and evaporated by a warm-water bath; .79 grain of extract was left.

B. A magma of phosphates and adhering alkaloid still remained above the urinous substratum; this was also removed by a pipette and transferred to a porcelain capsule; evaporated to dryness at 212°, and this residue exhausted by æther; the æthereal solution evaporated to dryness by a warm water bath, as before, gave .61 additional alkaloid.

Therefore $\frac{a}{.79}+\frac{b}{.61}=1.4$ grain of alkaloid were obtained by these two operations from the eight fluid ounces of urine.

Now to determine whether it were quinine, the following process was followed:—

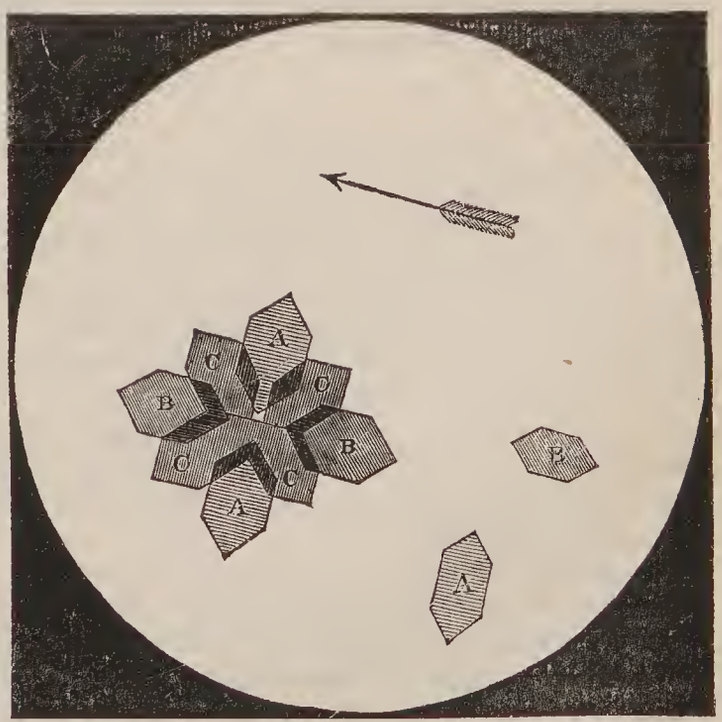
Test-fluid.—A mixture of three drachms of pure acetic acid, with one fluid drachm of rectified spirit of wine, to which six drops of diluted sulphuric acid were added.

One drop of this test-fluid placed on a glass slide, and the merest atom of the alkaloid added; time given for solution to take place; then upon the tip of a very fine glass rod an extremely minute drop of the alcoholic solution of iodine added; the first effect is the production of the yellow or cinnamon-coloured compound of iodine and quinine, which forms as a small circular spot; the alcohol separates in little drops, which by a sort of repulsive movement drive the fluid away; after a time the acid liquid again flows over the spot, and the polarizing crystals of sulphate of iodo-quinine are slowly produced in beautiful rosettes. This succeeds best without the aid of heat.

To render these crystals evident, it merely remains to bring the glass slide upon the field of the microscope with the selenite stage and single tourmaline beneath it; instantly the crystals assume the two complementary colours of the stage; red and green supposing that the pink stage is employed, or blue and yellow provided the blue selenite is made use of. All those crystals at right angles to the plane of the tourmaline producing that tint which an analyzing plate of tourmaline would produce when at right angles to the polarizing plate; whilst those at 90° to these educe the complementary tint, as the analyzing plate would also have done if revolved through an arc of 90°. Vide figs. 1 and 2.

In Fig. 1 and 2 the inferior tourmaline and selenite stage are employed. The arrows show the plane of the tourmaline.

Fig. 1.—Red Stage.



A. Red. B. Light Green. C. Brownish Yellow.

Fig. 2.—Blue Stage.

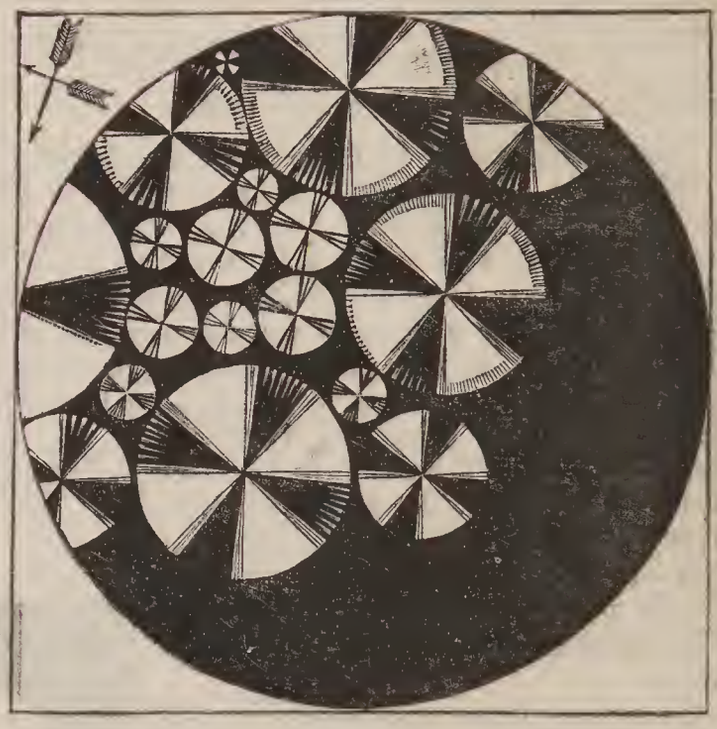
D. Yellow. E. Blue. F. Lilac.

This test is so ready of application and so delicate, that it must become *the test, par excellence*, for quinine. Vide figs. 1 and 2.

Not only do these peculiar crystals act in the way just related, but they may be easily proved to possess the whole of the optical properties of that remarkable salt of quinine, so fully described by me in the *Pharmacentical Journal*, vol. xi., pages 448 and 499, and the chemical analysis of which was published in vol. xii. of the same Journal; in fact, these crystals are perfectly identical with the sulphate of iodo-quinine in every respect.

To test for quinidine, it is merely necessary to allow the drop of acid solution to evaporate to dryness upon the slide, and to examine the crystalline mass by two tourmalines, crossed at right angles and without the stage. Immediately little circular discs of white, with a well-defined black cross very vividly shown, start into existence, should quinidine be present even in very minute traces. Vide fig. 3.

Fig. 3.



This is generally the case if hospital quinine or that of the British Alkaloid Company has been employed—these severally contain a very large percentage of quinidine; the former at least fifty, the latter about twenty; but Howard's disulphate of quinine scarcely contains five per cent. of quinidine, according to my experiments. These substances are easily separated in consequence of the much greater solubility of the disulphate of quinidine in cold water.

Water.

One part of disulphate of quinine requires ..... 740 at 60°;
One part of disulphate of quinidine requires ... 340 at 55°;

so that the latter is more than twice as soluble.

If we employ the selenite stage in the examination of this object, we obtain one of the most gorgeous appearances in the whole domain of the polarizing microscope; the black cross at once disappears, and is replaced by one which consists of two colours, being divided into a cross having a red and green fringe, whilst the four intermediate sectors are of a gorgeous orange-yellow. These appearances alter upon the revolution of the analyzing plate of tourmaline: when the blue stage is employed, the cross will assume a blue or a yellow hue according to the position of the analyzing plate.

These phenomena are analogous to those exhibited by certain circular crystals of boracic acid and to those circular discs of salicine (prepared by fusion†), the difference being that the salts of quinidine have more intense depolarizing powers than either of the other substances, besides which the mode of preparation effectually excludes these from consideration. Quinine prepared in the same manner as the

† I am indebted to my friend Mr. John Thwaites for this fact.

quinidine has a very different mode of crystallization; but it occasionally presents circular corneous plates, also exhibiting the black cross and white sectors, but not with one-tenth part of the brilliancy, which of course enables us readily to discriminate the two.

Having shown in my previous papers that *none* of the vegetable alkaloids, when treated with sulphuric acid and iodine, possess the power of forming crystalline compounds of similar properties, and these artificial quinine tourmalines being pre-eminent in their action on light, it follows that the existence of these crystals is a positive demonstration of the presence of quinine. It has also been proved by me that quinidine (β quinine) cannot produce them; therefore we perceive that quinine passes out of the system without experiencing any elementary change.

One subject is worthy of remark: the patient was taking forty grains of the disulphate of quinine (and quinidine); there were found 1.4 grain of mixed alkaloids, which would be equivalent to 1.884 grain of the disulphate of commerce; and if the patient voided three pints of urine in twenty-four hours, we should only account for 11.304 grains of the remedy used, leaving a deficiency of thirty grains; three-fourths of the substance being yet unaccounted for, which has either been assimilated in the body, or has been destroyed in its transit through the vascular system. It would be interesting to undertake a series of quantitative analyses in the healthy subject to determine these points:—

1st. Whether the whole of the quinine ingested disappears by the kidnies.

2ndly. If not, whether it passes out by other excretory organs, and which.

3rdly. To discover at what period after ingestion all evidence of its elimination from the kidnies ceases.

These questions having been answered, in health, they must be repeated when quinine has been used remedially, and by so doing we shall perhaps be in a position to say what the *medical equivalent* of quinine may be in a given disease.—*Philosophical Magazine.*

32, *Old Market Street, Bristol, July* 10, 1853.

ON THE OCCURRENCE OF INDIGO IN HUMAN URINE.

BY ARTHUR HILL HASSALL, M.D.

(*Abstract of a Paper read before the Royal Society*).

The author was led to the investigations laid before the Society in the above communication, by the following circumstances :

Some three or four years since, when examining urinary deposits under the microscope, he frequently observed in the field of vision particles of a deep blue colour ; so often did this occur, that he could not even then help suspecting that their presence was not accidental ; however, no analysis of the blue colouring matter was made at that time, and the circumstance was in a fair way of being forgotten, until the recollection of it was revived by another occurrence.

In June 1852, a sample of urine freely exposed to the air in an open vessel, was observed after four or five days' exposure, gradually to change colour ; the pellicle or scum which had formed upon the surface of the urine became first slate-coloured, and at length deep blue, with here and there a rusty-red tint. The urine also underwent at the same time some remarkable changes ; it became thick and turbid, deep brown, greenish, bluish-green, and finally of a faded yellowish-green colour ; a considerable sediment was found at the bottom of the glass ; this was deep brown, intermixed with a little blue colouring matter, and it had a medicinal smell resembling somewhat that of *Valerian.* In this state, without undergoing any further material changes, the urine remained for many days.

Examined with the microscope, the scum or pellicle on the surface was found to consist of vibriones, innumerable animalcules, and crystals of triple phosphate, with a great many fragments and granules of a deep and bright blue colour.

A second sample of the same urine was therefore procured, taking every precaution to avoid fallacy. Gradually the same changes ensued as in the first sample, and this likewise became blue. Having thus ascertained that the changes observed were due to something contained in the urine itself, the author next proceeded to set aside in open vessels, a series of urines all from the same patient, noting the alteration which occurred from day to day. These samples underwent nearly similar changes ; but the quantity of blue colouring matter and brown extractive gradually diminished,

until at length they were present in such small amount, as to be visible only under the microscope, and at last they entirely disappeared.

The results obtained from an examination of the *urine*, the *blue colouring matter* and the *brown extractive*, are then given by the author ; they are as follow :—

The urine.—The urine of the second sample at the time of analysis, when shaken, had a dark greenish-brown colour ; but on standing at rest for some time, the colouring matter fell to the bottom, forming bluish-green flocculi, while the supernatant liquid was of a deep wine-red colour. The bottle was set aside corked for ten days, at the end of which time the bluish-green precipitate had entirely disappeared ; but on removing the cork, and allowing free access of air for some time, the coloured deposit was again produced. This was washed with water, drenched with hydrochloric acid, and finally dried ; by this means was obtained a rich blue powder possessing all the chemical characters and properties of indigo.

The urine that was filtered off from the above precipitate was allowed to evaporate spontaneously, by which means it yielded an additional quantity of indigo, which adhered in the form of very small flakes to the sides of the dish. It also gave a rather large proportion of a deliquescent brown colouring matter, which was treated, first with alcohol, and then with water.

The alcohol acquired a deep brownish-red colour, and the water a dark brownish-green. Both of these solutions were evaporated at a temperature of 160° Fahr. The alcoholic solution furnished a rich brown extractive which was soluble in water, but not in dilute acids, and nitric acid did not produce that play of colours which is characteristic of bile pigment, nor did the precipitate formed with basic acetate of lead furnish a purple liquid with alcohol and free acid. A strong solution of potash dissolved the extractive and yielded a deep blood-red fluid, which was rendered green and opalescent by boiling. These reactions show that the brown pigment was somewhat like hæmatin in its chemical manifestations.

While the aqueous solution of the brown matter was undergoing evaporation, it gave a further supply of indigo, which was formed most freely at the edge of the liquid. The residue was made black by concentrated sulphuric acid, and deep brown by potash.

The blue colouring matter.—Of two samples of this in a dry state, mixed with a large quantity of earthy phosphates, vibriones, mucus, and epithelium, one gave a dark brown solution with concentrated sulphuric acid, and the other a dirty blue. Both of these solutions were decomposed by water, furnishing in the former case a dark brown deposit, and in the latter a dirty green. In most of their other reactions, however, they presented the characters of indigo ; and it is especially deserving of notice, that they were reduced by lime and sugar, giving a liquid from which hydrochloric acid threw down a greenish-blue precipitate.

The cause of concentrated sulphuric acid giving with one of these samples a brown solution, and with the other only a dirty blue, was, the author considers, mainly owing to the large quantity of animal matter with which the specimens were contaminated ; the acid, from its charring effect on this, would produce a brown or blackish solution, thus obscuring the colour of the solution of indigo.

The brown extractive.—The brown extractive yielded nearly the same results as on its first analysis, and the aqueous solution furnished a few blue flocculi. A portion of the alcoholic extract was heated with liq. potassæ for the purpose of ascertaining whether it contained leucine, and the product, on being treated with hydrochloric acid, gave off a powerful odour, which was somewhat like *valerianic acid ;* but the result was too doubtful to be of much value. The author had already referred to the peculiar smell of *Valerian* emitted by the extractive of more than one of the samples. He considers that the clearest and most positive evidence was thus obtained that the blue colouring matter in this case was indigo.

It was not very long after the occurrence of the first case of blue urine, that numerous other instances fell under the author's observation. The urines of all these cases underwent very nearly the same changes as in the first ; in some, the quantity of blue colouring matter found was very considerable, in others less ; and in the third class of cases the microscope was necessary for its discovery. In nearly all these cases the blue colouring matter was submitted to analysis, and ascertained, on the clearest evidence, to be indigo.

The author in the next place considers the question of the source and origin of indigo in the urine.

It appeared that in the cases related by the author, coloured indigo was not present in urine when first voided, but that it was gradually formed some time afterwards by a process of oxidation on exposure to the air, being in most of the cases probably derived from the brown extractive, which in its chemical manifestations so closely resembles hæmatin.

The author contrasts *cyanourine* with the indigo detected in urine. He observes that the most distinctive tests laid down for cyanourine are its solubility in boiling alcohol, and the action of sulphuric acid upon it, which give a reddish-brown solution; and states he had ascertained that these tests are not to be relied upon, since indigo, when contaminated (as in the urine it frequently is), with a large quantity of animal matter, vibriones, &c., gives a reddish-brown solution with concentrated sulphuric acid, from the charring of the animal matter, and in many cases forms a bright blue solution with boiling absolute alcohol; hence he could not help suspecting that cyanourine and indigo are very closely connected with each other, if they be not identical. He observes, it is at least singular that while so many cases of indigo were met with, not a single instance of cyanourine presented itself. He also contrasts indigo with apoglaucin, and remarks that this is acknowledged by Heller himself to be nothing more than cyanourine mixed with nrrhodin.

Taking then into consideration the whole of the facts described in this communication, the following conclusions are deduced:—

1st. That blue indigo is frequently formed in human urine, the quantity being subject to the greatest variation; in some cases it is so considerable as to impart a deep green, or bluish green colour to the whole urine; a pellicle of nearly pure indigo also extending over the entire surface of the liquid; while in others it is so small that it can only be detected by means of the microscope.

2nd. That for the formation of this indigo, it is in general necessary that the urine should be exposed to the air for some days in an open vessel, oxygen being absorbed and the blue indigo developed. Whatever facilitates therefore oxygenation, as free exposure to light and air, warmth and sunshine, hastens the appearance of the blue indigo; hence in summer the changes described take place much more quickly than in winter; on the contrary, these changes are retarded and even stayed by exclusion of the atmosphere. Blue indigo may even be deprived of its colour and reformed, alternately, according as air is excluded or admitted to urine containing it. From some of the cases recorded, it would appear, however, that blue indigo is occasionally formed in the system, and is voided as such in the urine.

3rd. That there is usually found with the blue indigo, where the amount of this is considerable, a brown extractive, sometimes in large quantity, the aqueous solution of which, by exposure to air, yields a further supply of coloured indigo, and which closely resembles hæmatin in its chemical manifestations and elementary composition. There is therefore great reason for believing that in the majority of the cases here recorded, the blue indigo was derived from altered hæmatin, although it is at the same time probable, that in some cases it is formed from modified urine pigment, which is itself supposed to be a modification of hæmatin. Between the greater number of the animal colouring matters there is the closest relationship in chemical composition, so that the transformation of the one into the other would appear to be both easy and natural.

4thly. That the urines in which the coloured indigo occurs in the largest quantity, are usually of a pale straw colour, readily becoming turbid, alkaline, and of low specific gravity. Small quantities of indigo are however frequently found in urines possessing characters the very reverse, that is, in such as are high-coloured, acid, and of high specific gravity; but, as a rule, in these urines the blue pigment is usually absent.

5thly. That as coloured indigo does not occur in healthy urine, and since where the amount of this is at all considerable it is accompanied with strongly-marked symptoms of deranged health, the formation of blue indigo in urine must be regarded as a strictly pathological phenomenon, apparently associated rather with some general morbid condition, than essentially with disease of any one organ; although there is reason for believing that the blue deposit is met with very frequently in Bright's disease, and in affections of the organs of respiration; it should however be remarked that none of the worst cases of indigo in the urine which the author met with were cases of Bright's diseases.—*Proceedings of the Royal Society*, Vol. vi., No. 97.

ON THE ORIGIN OF ROTTEN-STONE.

Professor Johnston, in a communication made to the Geological Section of the British Association at Hull, "On a Chemical Cause of Change in the Composition of Rocks," adduced, as an example of a chemically-altered rock, the rotten-stone of Derbyshire, a light and porous aubstance, used chiefly for polishing metals, and stated in Phillips's Mineralogy to be composed of silica, alumina, and carbon. It is obtained from a ridge in Derbyshire, known as the Great Fin, on the right hand side of the road from Bakewell to Buxton. This ridge is covered with "drift" ten or twenty feet thick, consisting of brown clay, with manes of black marble, chert, and rotten-stone. The rotten-stone is so soft whilst in the soil, that the spade goes through it readily, but it hardens on exposure. The holes from which it is dug are sometimes only two feet deep, at others from six to eight feet. On examining a series of specimens, Professor Johnston found that whilst some were homogeneous, others had a nucleus of black marble; he then treated specimens of the black marble with weak acid, and found that on the removal of the carbonate of lime, there remained from fifteen to twenty per cent. of a silicious substance perfectly like the natural rotten-stone. He concluded that there existed in the soil some acid which penetrated it and dissolved out the calcareous matter of the rocks below. The agent in this case might be the carbonic acid of the air, brought down by rain; but there were instances not capable of explanation by this agency alone, and attributable to other acids, which are produced under certain conditions, and exercise a much wider influence. The bottoms of peat bogs present very strong evidence of the action of acids; the stone and clay are bleached and corroded, only siliceous and colourless materials being left. The source of the acid is here the same as in the former instance; the vegetable matter growing on the surface produces in its decay acid substances which exert a chemical action on the subsoil, and escape by subterranean outlets, carrying away the materials dissolved in their progress. Another instance was afforded by the mineral Pigotite, formed in the caves of Cornwall by water dripping from the roof. This water contains a peculiar organic acid, derived from the soil of the moors, which dissolves the alumina of the granite and combines with it. The organic acids are very numerous and different in composition, but agree in producing chemical action upon rocks. They are produced over the entire surface of the earth, especially over uncultivated tracts, and are the means provided by nature to dissolve the mineral food of plants; they are also amongst the chief causes of the exhaustion of soils. The author then alluded to Professor Way's examination of some of the green-sand strata of Surrey, known as *firestone*, a light and porous rock, containing silica in a soluble state. It was well known that common sandstone, quartz, or rock crystal were not acted upon by potash or soda at ordinary temperatures; but of the firestone thirty per cent., and sometimes fifty or seventy per cent. may be dissolved. In all such cases the silica must have been originally in a state of chemical combination with lime, alumina, or something else, which has been subsequently removed. The silica in the rotten-stone was soluble, but he had never met with instances of black marble in a bedded state converted into rotten-stone. He believed, however, that a similar cause operating over a wide area, and during a long period, had produced the altered condition of the firestone.

In the discussion which followed this communication, it was stated that excellent rotten-stone was obtained in the Vale of Neath, where coal-measure limestone also occurred. To constitute a good article it was necessary that it should be free from grit, and such was worth £12 a ton. It was suggested, that now its origin was known, it might be produced artificially. Professor Sedgwick stated that geological rotten-stone unfit for use, was common, and afforded a good illustration of the action described by Professor Johnston. He recommended that it should be sought for beneath the "dirt-bed" of the Isle of Portland, and wherever ancient deposits of vegetable soil occurred.

SUCCUS TARAXACI PARATUS.

BY MR. WILLIAM PROCTER, JUN.

The preparations of Taraxacum, or *dandelion* root, have within a few years past attracted considerable attention from the medical profession, and have been an object of experiment for skilful Pharmaceutists, both in England and the United States.

The hurtful effect exercised by heat in evaporating solutions of the soluble matter of dandelion, has long been noted, and many recollect the molasses-like extract which formerly was too commonly seen, unmarked by any distinct, sensible property of the recent root. The application of spontaneous and vacuum evaporation in making the solid extract, demonstrated this beyond cavil; and in the last U. S. Pharmacopœia directions were given for this precaution, as well as in regard to the period of collecting the root. The *Liquor Taraxaci* (fluid extract) described by Mr. Redwood in Gray's Supplement, is prepared by macerating four pounds of the recently dried root in sufficient cold water for twenty-four hours, expressing, and evaporating to thirty-six fluid ounces, to which liquid twelve fluid ounces of alcohol is added; hence each fluid ounce of the preparation represents a troy ounce of the *dried* root. The dried root of the dandelion is more easily extracted than when it is recent, owing to the glutinous character of the juices and the difficulty of effectually disintegrating the tissue of the root, so as to completely reach the contained matter by menstrua; yet it is more than probable that the evaporation of the aqueous solution to the proper degree of concentration, not to speak of the effect of the process of drying the root in the first place, injures the product. This is partially avoided by a process which I published in the twentieth volume, page 86, of this Journal, the *recent* root not being employed, aud the resulting preparation representing about twice its weight of the fresh root. In the preparation about to be described, the virtues of the root, be they what they may, are preserved unimpaired, as no heat is employed in the process; the natural juice of the plant being merely admixed with sufficient alcohol to preserve it from change. Take of fresh dandelion roots (collected in September or October) twenty pounds (*av.*) alcohol, .835 sp. gr. four pints. Slice the roots transversely in short sections, and by means of a mill or mortar and pestle, reduce them to a pulpy mass; then add the alcohol and mix them thoroughly. The mixture thus far prepared at the season when the root is proper for collection, may be set aside in suitable vessels—stoneware jars are appropriate; and extracted as the preparation is needed through the other seasons. After having stood a week, or until a convenient time, the pulpy mass is subjected to powerful pressure, until as much as possible of the fluid is removed. This is then filtered and bottled for use. It is necessary that sufficient time should elapse after the pulp is set aside, for the alcohol to penetrate the fibrous particles and commingle with the natural juices, as well as for the woody structure of the root to lose its elasticity, that it may yield the juice more completely on pressure. When the pulp has stood six months in this manner it yields the juice with great readiness, and possessed of the sensible properties of the dandelion in a marked degree. When eight pounds, avoirdupois, of the root is thus treated, after standing several months, the practical result is about six pints of fluid, with an ordinary screw-press. This yield will vary in amount with the condition of the root when collected, and the length of time it is exposed afterwards, as well as the power of the press used. Should the alcohol in this preparation be contraindicated, it might be partially removed by exposure in a water-bath until the juice was reduced to five-sixths of its bulk, and then for every pint of the residue, eight ounces, troy, of sugar may be added and dissolved in it.—*American Journal of Pharmacy.*

FLUID EXTRACT OF HYOSCYAMUS.

The following formula was communicated by Mr. Charles Augustus Smith, of Cincinnati, who states that the preparation it affords has been much used and liked in that city. When made from carefully dried and good hyoscyamus, it must be a fair representative of the plant.

Take of Hyoscyamus leaves (garbled) eight ounces (troy.)
Diluted alcohol, a sufficient quantity.
Sugar, eight ounces (troy.)

Reduce the hyoscyamus to a uniform coarse powder; pour over it a pint of diluted alcohol; allow it to macerate twenty-four hours; put it into a suitable percolator, and, when carefully packed, pour gradually on it diluted alcohol, until three pints of tincture has passed. The flow should be very slow, that thorough exhaustion of the leaves shall take place. The tincture is then evaporated to ten fluid ounces, the sugar dissolved in it while hot, and when cold two fluid ounces of alcohol (.835 sp. gr.,) or as much as is sufficient to make the whole measure a pint is added, and the fluid extract passed through a fine muslin strainer.

This preparation affords an admirable means of prescribing henbane in fluid preparations. The alcohol of the tincture is avoided, and the trouble of incorporating the solid extract superseded. It is of the same proportional strength as the fluid extract of valerian, and the dose varies from fifteen drops to half a teaspoonful, the latter dose being equivalent to two or three grains of extract.

When the Apothecary has in possession solid extract of hyoscyamus of *ascertained* good quality, a fluid extract of similar strength may be obtained by triturating half an ounce of the extract with ten fluid ounces of water till dissolved—eight ounces of sugar dissolved in it, and finally sufficient alcohol to make it measure a pint, and strain. Practically, henbane yields but five per cent. of extract; the above recipe assumes it to be $6\frac{1}{4}$ per cent.—a difference altogether proper in view of the possible injury to the juices in preparing the extract originally.—*American Jour. of Pharmacy.*

ON THE MEANS OF DETECTING THE PRESENCE OF CHICORY IN COFFEE.

BY J. L. LASSAIGNE.

Several characters, sufficiently simple and easily recognized for general application, have been indicated, in different works, for detecting the addition of roasted chicory to coffee in the roasted and ground state, but the application of chemical reagents for detecting the presence of the colouring matter of roasted chicory when added to infusion of coffee, has not yet proved successful.

The following experiments were undertaken with the view of solving a question of some interest, which frequently presents itself under various circumstances, and which has recently been forced upon my attention in the examination of some chicoried coffee which had been seized.

The brownish-yellow colouring matter, which is developed in chicory root by the process of roasting, when dissolved in water by infusion or decoction, retains its colour, or becomes a little deeper by the action of persalts of iron, without giving rise to any precipitation.

The brown colouring matter of roasted coffee, on the other hand, acquires, from the same reagent, a green colour, and a brownish-green flocculent precipitate is formed.

These two different reactions may be applied, not only for distinguishing the pure infusion of coffee and of chicory, but also those which contain a mixture of the soluble principles of these two alimentary substances.

Infusion of pure coffee acquires a green colour, more or less intense, on the addition of some drops of persulphate of iron.

Infusion of pure chicory, under similar circumstances, retains its brownish-yellow colour, which becomes more intense, and acquires a slight greenish tint.

A mixture of the two infusions, containing one-half, a fourth, or a fifth of its volume of infusion of chicory, may be recognized by its brownish-yellow colour, which remains after the deposition of the precipitate produced by the salt of iron, together with part of the colouring matter of the coffee. This separation may be expedited by rendering the coloured liquor slightly alkaline by the addition of a small quantity of weak solution of ammonia, and allowing it to stand in tubes closed at one end. The supernatant liquor, after the precipitate has deposited, will possess a brownish-yellow tint by refracted light, which will be deeper in proportion to the quantity of chicory present.

If the experiment be first made with infusion of pure coffee of a certain strength, and afterwards with additions of known quantities of chicory, keeping these for comparison, the quantity of chicory in a mixed sample may be thus determined.—*Journal de Chemie Medicale.*

ON COCA LEAVES.

BY H. WACKENRODER.

In the *Encyclopædia of Medical Sciences*, edited by Basch, v. Gräfe, Hufeland, Link, and Müller, 1834, there is the following communication from Professor Schlechtendal:—

The species Erythroxylon belongs to the Decandria Trigynia of the Linnean system, and forms a small natural family (*Erythroxylaceæ*), which was formerly

included among the Malphighiæ. It consists chiefly of South American shrubs and trees, with alternating leaves, small axillary flowers, either single or grouped in bunches. They have a five-partite calyx with five-flower leaves, furnished with a scale at their base, ten stamens united together into a tube, three delicate or contorted styles, and monospsermous fruit. The wood of several varieties is used for dyeing. The use which is made of the leaves of one variety, *Er. Coca*, Lam., in Peru, is interesting. These leaves, about the size of cherry leaves, are pale green, of delicate texture, possessing an agreeable odour and an herbaceous taste, which, after a time, becomes sweet, bitterish, and rather astringent. The miners and messengers in Peru frequently take no other food than coca for several days together, and are so powerfully stimulated by it, that they are able to work or travel without intermission. A paste is made of the ash of maize cobs, and a few other wild saline plants, in the form of cakes, like chocolate, and dried. It is then hard, and is called *Tocera* or *Lipta*. A piece of this is chewed with a sufficient quantity of coca, then kneaded into the form of small balls, and kept in the bag containing the coca. This manipulation is called *Acullicar*. These pellets are then taken separately in the mouth, and retained as long as they taste astringent and pungent, after which it is thrown away and another taken. In two or three hours four or five such pellets are consumed, and about that number are made at once.

The coca contains gum, but no considerable quantity of resin. The effects upon the system are tonic, soothing, and nutritive, it prevents weakness of the stomach and the consequent obstructions, colic and hypochondria. This use of the leaves has extended as far as Brazil, so that the tree is cultivated in many places. In Brazil it is called *Ypadu*. The leaves are there dried in the shade or upon the ovens used for roasting meal, then finely powdered in a wooden mortar alone, or with the ash of the leaves of *Cecoopia palmata*, and preserved in the hollow stems of grass. From time to time the mouth is filled with this greenish-grey powder, especially when it is desired to overcome hunger or drowsiness. It increases the secretion of saliva, produces a sensation of fulness and warmth in the mouth and stomach, stills hunger, and increases the bodily activity. Taken in great quantity or by persons of weak nerves, it produces lassitude and drowsiness. There is no doubt that these leaves might be usefully employed among us.

Further particulars have been made known by Tschudi in the account of his travels, and it is probably on this account that the attention of physicians has again been directed to the coca.

The author has made a chemical examination of these leaves but has not obtained any very satisfactory results. In appearance the leaves resemble those of senna, and are generally broken. Upon the upper surface they are dark green, upon the lower surface whitish, with thick veins, the midrib being particularly prominent. Their smell is somewhat like that of green tea, their taste herbaceous and aromatic. Extracted with alcohol they yielded chlorophyle and a little wax. The residue left showed the usual indications of tannin, gelatine gave a yellowish-white precipitate, perchloride of iron produced a dirty green colour.

The active properties of these leaves may be partly ascribed to the tannin, and the aromatic substance present in them ; but as in the case of tea, the stimulating influence can scarcely be altogether owing to the small quantity of those substances contained in the infusion usually drunk. It is probable that the coca leaves contain a nitrogenous substance similar to theine.—*Archiv. der Pharmacie*, July, 1853.

ON THE APPLICABILITY OF MOLYBDIC ACID AND THE MOLYBDATES IN DYEING AND CALICO PRINTING.

BY W. H. KURRER.

The suggestion of Dr. Keller to substitute for indigo a compound of molybdic acid with protochloride of tin, induced the author to institute some experiments, with the especial view of ascertaining how far there might be any practical advantage in the application of molybdic acid and its compounds in the dyeing of silk, cotton, and linen fabrics.

The substance employed in these experiments was obtained from the factory of C. E. Brosche, at Prague, and prepared according to the process recommended by

Christl,—melting equal quantities of powdered native molybdate of lead and anhydrous carbonate of soda in an iron crucible, pouring off the molybdate of soda from the fused metal, dissolving in hot water, and boiling with an excess of nitric acid until the molybdic acid separates as a bright yellow powder, amounting, when washed and dried, to a third of the ore.

The molybdic acid thus prepared is not indeed quite pure, but still sufficiently so for any practical application in dyeing.

The double soda salt of phosphoric and molybdic acid is furnished by this factory in the form of a beautifully white crystalline salt, which requires to be preserved in well closed vessels, on account of its effloresceing in the air.

Dyeing of Silk and Silk Stuffs.—The most intense dark blue colour of the double molybdate of molybdinum and tin is obtained when the silk or silk fabric is impregnated with molybdate of ammonia, then passed in a dry state through an hydrochloric acid bath, and immersed directly, without being washed, in a bath of protochloride of tin, after which it is at once washed and dried.

Lighter blues of all shades, even to the most delicate ash grey, are obtained when the solution of molybdate of ammonia is proportionately diluted.

Silk and silk fabrics impregnated with a solution of molybdate of soda, dried and then treated in the same way with hydrochloric acid and protochloride of tin, acquire a bright medium blue.

All the shades of colour produced by the compound of a molybdate and protochloride of tin are characterized by extreme durability under the influence of light and air.

The compounds of molybdic acid are not, on the contrary, so well adapted to printing upon silk, as only topical colours can be produced with them.

Dyeing of Cotton Stuffs.—The colours produced upon cotton fabrics by molybdic compounds are inferior and less intense than those communicated to silk. The darkest and purest blue is produced with molybdate of ammonia.

The various tints are all durable, and a white pattern may be printed upon the cotton in the same way as when dyed with indigo by a mordant of chromate of potash and an acid discharge.

Application of Molybdic Dyes to Calico Printing.—Dr. Keller's statements appeared to afford sufficient grounds for anticipating that these compounds would become very valuable materials in printing as well as dyeing. Experience, however, shows that such is not the case, for when the calico, impregnated with molybdate, is immersed in the hydrochloric acid bath, and even when the acid is concentrated and warm, only a faint yellow tinge is produced, which disappears again completely on washing with water. The washed stuff acquires only a faint blue or grey shade when immersed in a bath of protochloride of tin.

A variety of attempts were made to effect the decomposition of the alkaline molybdates, upon cotton and silk fabrics, by means of acetic, tartaric, oxalic, and citric acids, &c., and produce a yellow colour upon them; but they were all ineffectual. The stuffs acquired in the protochloride of tin bath only a faint dirty grey, instead of a blue colour.

If, therefore, the precipitation of the molybdic acid upon the stuffs cannot be adequately effected, and if this acid will not combine with the fibres, so as to resist the solvent action of water, and in both points the author has failed, it is evident that these substances cannot be very extensively employed in printing.

They may be employed for producing a topical colour, thus:—A solution of molybdate of soda is mixed with albumen, and after the printing the stuff is dried and passed, first, through a bath of warm hydrochloric acid, and then through a bath of protochloride of tin, where the blue colour is developed. Dextrine or tragacanth may be substituted for the albumen.

The topical colour produced by molybdic acid upon cotton stuffs is very durable under the influence of light and air.—*Dingler's Polytech. Journ.*, 1853.

ON THE FABRICATION AND VALUATION OF VARIOUS CYANOGEN COMPOUNDS.

BY R. BRUNNQUELL.

Remarks on the present Mode of fabricating Ferrocyanide of Potassium.—It has long been a subject of complaint, that, notwithstanding the progress of technical chemistry, the fabrication of ferrocyanide of potassium should remain in such an

imperfect state; for even in the most favourable instances the product does not, on the average, amount to more than one-third of the quantity that ought to be obtained by the perfect conversion of the materials employed. It is likewise well known that none of the processes recommended within the last ten years have been found practically available, especially, for instance, the attempt to employ atmospheric air as a source of the cyanogen, which, to judge from the large scale on which it has been tried in France and the results reported by the Academy commission, must be regarded as unsuccessful.

For the present, at least, it appears that the old process is the only one which is practicable; and the endeavours of manufacturers must therefore be directed towards perfecting this, as far as possible, in its details, with regard to which the most diverse and even contradictory views are now entertained both by practical and scientific chemists.

First of all it is necessary to furnish satisfactory solutions of several questions, which, although much discussed, have never been decided either way. Thus, whether it is more advantageous to use the animal substance in a charred state, or only well dried; to mix the animal substance at once with the potash, or to add it afterwards, when the latter is melted; to add iron at the beginning of the operation, at the end, or not until the melted product is treated with water; to conduct the melting rapidly, and at a high temperature, or gradually, at a lower temperature. It must further be decided, whether the use of purified alkali is attended with a corresponding increase of the product; whether the increase of product obtained with closed vessels is counterbalanced by the smaller cost of open pans, and the greater facility, as well as rapidity of working them, &c.

Lastly, The most advantageous proportion of potash to the other materials still remains to be determined. Although it is now almost universally admitted that on the average equal parts is the best proportion, still this must be modified according to the nature of the animal substance, as its percentage of nitrogen varies considerably.

The elucidation of these several points of dispute can only be effected by means of an extended series of experiments, for which, however, the scientific chemist wants material, and the manufacturer a process for readily and easily determining, at an moment, the value of the melted mass, without interrupting the operation.

For this purpose the following process furnishes results which are even more than necessarily accurate; it occupies but little time, and requires no special chemical knowledge. Since likewise the scientific Chemist does not possess any particularly exact method of determining the cyanogen compounds of iron, this process may possess other than technical interest.

This process consists in the precipitation of the ferrocyanide of potassium in the acidified solution of the "melt" by a solution of persalt of iron of known value. Two difficulties were here to be overcome: first, to recognize the point of saturation, notwithstanding the permanent suspension of the Prussian blue in the liquid; secondly, the mechanical precipitation of ferrocyanide of potassium with the Prussian blue.

The former difficulty was overcome by a very simple contrivance, which is in so far of general interest, that it renders practicable a great number of volumetrical determinations of substances, for instance, which give intensely coloured precipitates. A drop of the liquid, coloured by the suspended precipitate, is allowed to fall upon white bibulous paper; and after a few minutes the precipitate settles upon the spot where the drop fell, while the liquid spreads out all round in a perfectly colourless ring, upon which, by the application of an appropriate test, a reaction is produced, indicating whether or not the precipitation is complete. Thus, in the present instance, a blue colour is produced *before* perfect saturation by a persalt of iron; *after* saturation, by ferrocyanide of potassium. The point at which the former reaction ceases, and that at which the latter begins, correspond to only two or four drops of the test liquid; consequently, by waiting for the latter reaction, the result obtained is not at the utmost more than 0.25 or 0.50 per cent. too high. The test is therefore sufficiently trustworthy.

The second difficulty was overcome by determining the proportion of ferrocyanide carried down with the Prussian blue. The closely corresponding results of comparative experiments showed that this was exactly $\frac{1}{20}$ of the ferrocyanide present, at least under the circumstances which always attend the analysis.

The presence of sulphocyanide of potassium in the "melt" does not invalidate

the result, because sulphocyanide of iron is not formed until the *whole* of the ferrocyanide of potassium is removed.

To experienced Chemists the above description will suffice. It only remains to add that the test solution of persalt of iron is best prepared by determining the quantity of oxide of iron contained in 100° of a moderately concentrated solution of the salt, and thence calculating the equivalent quantity of ferrocyanide of potassium;

$$1 : 2.257 + \frac{2,257}{20} = n : x,$$

n being the quantity of oxide of iron contained in 100° of test liquid, and x the quantity of "melt" to be used. As the "melt" is not easily powdered and is very hycroscopic, it might be better to weigh any chance quantity, and then to calculate the number of degrees of test liquid required for x. Thus, for instance, 8.98 grm. of "melt" require 12°.5; consequently x grm. contain y per cent.

For practical purposes the following method should be adopted:

Preparation of the Test Liquid.—Half-a-pound of protosulphate of iron is dissolved in boiling water, a very little sulphuric acid and a few fragments of clean iron added until the liquid appears bright green; it is then filtered rapidly, and allowed to cool in a covered vessel. The crystals thus obtained, free from copper and peroxide of iron, are well dried between bibulous paper, exactly 83.28 grm. weighed and dissolved in about three-fourths of a litre of pure water; the solution is heated to the boiling point in a basin, and nitric acid added gradually until red vapour is no longer disengaged, and then made up with water to the exact volume of a litre. The test liquid is now ready for use. 100 cubic centimetres precipitate exactly 10 grm. of pure ferrocyanide of potassium; consequently each cubic centimeter required represents one per cent. of this salt.

Mode of conducting the Determination.—Several samples of the "melt" to be examined are broken up together, 10 grm. weighed and dissolved in a small quantity of hot water, the liquid filtered, and the residue well washed with hot water. A few drops of the test liquid are poured in from the measured volume in the burette, and then a little dilute hydrochloric acid is added gradually until the brown precipitate formed at first becomes blue. The gelatinous silica which is separated at the same time is disregarded. The test liquid is then added, four or five drops at a time, and after each addition a drop of the blue liquid is placed on bibulous paper free from iron. The moist ring formed upon the paper is touched with a glass rod dipped in a solution of persalt of iron. As long as a blue colour is produced upon the paper, the addition of test liquid is continued; and when a brown colour (sulphocyanide of iron) is produced upon the paper, it is tested in the same manner with ferrocyanide of potassium until the first appearance of a blue colour. In applying these tests to the paper it must be remembered—1. That the colour does not become visible until after a few moments; 2. That it is not produced at the outer edge of the moist ring, but more towards the centre. Every cubic centimetre added up to this point represents one per cent. of crystallized ferrocyanide of potassium in the "melt." In order to test the certainty of this method after the determination has been completed, the liquid may be filtered, and one portion treated with a persalt of iron, another with ferrocyanide of potassium; if the experiment has been carefully conducted the latter reagent produces only a very slight blue tinge.

It is obviously above all things important to estimate the weight of the whole "melt," for this may be considerably altered by very insignificant circumstances.

Valuation of Pigments containing Prussian Blue.—A number of blue pigments occurring in commerce, consist of Prussian blue mixed with a variable proportion of some white powder. Some green pigments likewise consist of Prussian blue and chrome yellow, frequently with a white powder, or an organic yellow substance. A simple method of determining the quantity of Prussian blue in such pigments would often be serviceable, and as Prussian blue may readily be converted into ferrocyanide of potassium, the above method may be applied for this purpose. The experiment is conducted as follows:—

In order that the test liquid prepared as above may be used, 6.790 grm. of the pigment to be examined is weighed, boiled with caustic potash until the blue or green colour is destroyed, the liquid filtered, the residue well washed with hot water, and the filtrate containing ferrocyanide of potassium treated in the same manner as that obtained from the "melt." As in this case there is no sulphocyanide of potas-

sium present, the addition of the test solution of iron and the testing of the liquid on paper with a persalt of iron may be continued until the reaction with the latter ceases. At this point the volume of test liquid used is read off, and the number of drops required to be added before the first trace of the blue colour produced on the paper by ferrocyanide of potassium appears is observed, when half this number is added to the volume read off, before the percentage of Prussian blue is ascertained very accurately. If it so happens that the blue precipitate does not settle readily upon the paper, but spreads out over the moist ring, this inconvenience may be prevented by the addition of some solution of chloride of sodium, or any other indifferent salt. This spreading of the colour is owing to the formation of a little Prussian blue that is soluble in water though not in a strong saline solution.

Valuation of the Commercial Solution of Red Prussiate (Ferricyanide of Potassium).—The difficulty and loss attending the crystallization of this salt has led to its introduction into commerce in solution. The more general application of this liquid as a substitute for the crystallized salt, is chiefly prevented by the want of any certain means of determining even approximatively the percentage of salt. It is probable that the process above described may be so applied as to be of service in this respect.

The ferricyanide of potassium may be readily converted into ferrocyanide by appropriate reducing agents. The experiment is thus conducted:—

7.99 grm. of the liquid to be examined is weighed in counterpoised vessels, a few grammes of sulphite of soda and a little caustic potash added, and the whole boiled. Generally there is no precipitate formed, but if there is any it is better to separate it by filtration. The reduction may be effected by means of iron turnings and caustic potash, but even then filtration is requisite. (The perfect conversion of the salt into the yellow prussiate, and the purity of the protosulphate of iron prepared according to the above directions, may easily be ascertained by mixing a small quantity of the reduced red prussiate with the latter solution. The precipitate ought to be perfectly white.) The solution of ferrocyanide of potassium thus obtained is then acidified and treated in the manner above described with the test solution of persalt of iron.

Valuation of Commercial Cyanide of Potassium.—The processes proposed by Liebig and by Fordos and Gelis, are open to no other objection than the trouble of preparing test liquids. Those who employ the above process for examining red and yellow prussiates of potash, and likewise require to examine cyanide of potassium, may avoid this trouble by making the same test solution of persalt of iron applicable to the valuation of the latter salt also.

For this purpose 9.246 grm. of the cyanide to be examined is dissolved in a small quantity of water, and mixed with about as much solution of protosulphate of iron free from peroxide and copper. The mixture is boiled for some time, filtered, and the filtrate containing ferrocyanide of potassium treated as above with the test solution of persalt of iron. Each cubic centimetre used represents one per cent. of cyanide of potassium in the substance examined.—*Polytechnisches Central Blatt.*

ON THE PROCESSES CONNECTED WITH THE FABRICATION OF SUGAR FROM BEET MOLASSES.

Although by some it is considered doubtful whether the production of sugar from the beet admits of being advantageously worked in Great Britain, and without danger of injury from possible future improvements in the extraction of sugar from the cane-juice, still there are others who entertain a contrary opinion. The physical grounds upon which the production of sugar from beet grown in Ireland is advocated, have been very ably stated by Mr. Sullivan;* whether social hindrances to its success exist, must be decided elsewhere; but the fact that this branch of industry has existed for some years in France and Germany with increasing success, and notwithstanding the imposition of a heavy duty, has acquired a perfection almost unequalled, together with the attempt to establish it in Ireland, naturally invest the subject with some degree of interest for the practical chemist.

It is in France that the greatest improvements have been made in the processes adopted. One of the most important of these is the extraction of crystallized sugar

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* *On the Manufacture of Beet-Root Sugar in Ireland.* By W. R. Sullivan, Chemist to the Museum of Irish Industry. Dublin : M'Glashan.

from the molasses, which for a long time was of little value, and from the belief that it contained only amorphous sugar, was used for making alcohol.

MM. Leplay and Dubrunfaut were the first to recognize that the sugar in the molasses is crystallizable, and possesses all the characters of ordinary sugar, and that the only difficulty was the separation of the foreign substances which prevent its crystallization. The solution of this problem was of great importance, for the quantity of molasses annually produced in France is 40,000,000 kilograms., containing more than half of its weight of sugar.

A description has been given by M. Nicklès* of the process introduced by MM. Leplay and Dubrunfaut. It is based upon the fact that sugar forms an insoluble compound with baryta, again decomposable by carbonic acid. When a boiling solution of caustic baryta of 30° B. is poured into the beet molasses, a porous crystalline mass is formed, insoluble in water, and therefore admitting of being thoroughly washed. After being thus purified, the saccharate of baryta is white, and has the appearance of a thick paste ; it is exposed to a current of carbonic acid which takes up the baryta, and sets the sugar at liberty. This operation is carried on in large vats of wood, 80 to 100 hectolitres in size, into which strong pumps worked by steam inject carbonic acid, obtained by the calcination of carbonate of lime in lime furnaces. While the reaction of the carbonic acid is going on, it is observed that the paste of saccharate, before very thick, gradually liquifies, and when complete, the whole is a solution of sugar, containing carbonate of baryta in suspension. To separate the carbonate, the mixture is put into sacks made of cotton fabric, through which the syrup filters clear, while the carbonate is retained. These sacks, after draining thoroughly, are pressed lightly in a screw press, and then subjected to heavy hydraulic pressure, in order to extract the syrup from the carbonate. This syrup, thus obtained, marks 18° to 22° B., it is white, of agreeable taste, and holds in solution some traces of the carbonate and bicarbonate of baryta, which may be removed by means of a sufficient quantity of plaster of Paris or of sulphate of alumina. Finally, it is clarified by means of dried blood ; it is skimmed and filtered, and boiled down like a syrup for the refinery, after which it is put into forms for crystallizing. We thus obtain at once sugar equal in quality to the finest sugar of commerce.

With regard to the residues of this process, the carbonate of baryta, saline substances contained in the molasses, quicklime proceeding from the calcination of the limestone, &c., I have learned the following facts : The carbonate of baryta may be used an indefinite number of times, it is rendered caustic anew after each operation, by mixing it with charcoal and heating it, and so it serves again. The loss of the baryta, which is unavoidable, is made up from sulphuret of barium, obtained by calcining the sulphate with charcoal. The sulphuret of barium possesses equally the property of precipitating the sugar, only there are two equivalents of sulphuret required, while one equivalent of oxide would suffice. Thus :

Sugar + BaO + HO = Saccharate of BaO + HO, whilst the sulphuret affords

Sugar + 2 SBa + HO = Saccharate of BaO, SH, SB.

Hence there is lost one equivalent of sulphuret of barium. To avoid this loss, one equivalent of potash or soda is added to the molasses, and then on pouring in the sulphuret of barium all the baryta is precipitated as saccharate, and the liquid retains the potassium in the state of hydrosulphate.

2 Sugar + 2 SBa + KO + HO = 2 Saccharate of BaO + SH + SK .

The potash used may be recovered as carbonate, indeed it would be too expensive for the purpose if this were not done after each operation. To this end, the liquors from each washing are collected, evaporated, the residue calcined in a reverberatory furnace with chalk or lime, and fused. The product is broken up, lixiviated, rendered caustic by means of lime, and the leys concentrated.

In this operation there is obtained not only the potash used in the process, but likewise the potash and soda existing in the juice of the beet, and which by accumulation in the molasses amounts to about ten per cent.

The molasses from cane-sugar contains, according to MM. Leplay and Dubrunfaut, 60 to 70 per cent. of crystallizable sugar, and 30 per cent. of uncrystallizable sugar, which is produced during the extraction, and does not exist in the fresh juice of the cane. Consequently the application of this process to the molasses of cane-sugar depends upon the possibility of modifying the extraction in such a way as to prevent the formation of uncrystallizable sugar.

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* *Silliman's Journal*, Sept. 1853.

ON THE MANUFACTURE OF HUMULINE.

The hops used in the manufacture of humuline, or concentrated extract of hops, are first dried in a stove or oven heated to 86° Fah., and when brittle are rubbed through a sieve, the meshes of which are about one-tenth of an inch wide. The coarse powder thus obtained is next placed in a closed cylinder, and as much alcohol is poured on it as the powder will absorb, after which a further quantity is added until a layer of alcohol of the depth of $1\frac{1}{2}$ inch covers the powder. The contents of the cylinder are then submitted to considerable pressure, and allowed to remain in this state for twenty-four hours, after which the alcoholic tincture is run off through a tap in the lower part of the cylinder into a tub or other suitable recipient. Water is then added to the hops in the cylinder until the liquor that passes out through the exit-tap is clear and colourless. This liquor is again added to the hops, and they are macerated in it for forty-eight hours, after which time the hops are again washed with fresh supplies of water in order to remove all soluble extractive matter. By this process there are obtained an alcoholic tincture holding the essential oil of hops in solution, and an aqueous solution of the principles soluble in water.

To form the humuline the following process is adopted:—The alcoholic tincture is placed in a suitable still heated by a water-bath, and the alcohol is distilled off, leaving as a residuum the essential oil and a brownish yellow resin, covered with a layer of yellowish liquor some inches in depth composed of watery extract. This watery extract is then added to the aqueous solution before mentioned, and evaporated by steam heat to the consistence of a soft extract. To this extract the essential oil and resin are next added, and the product thus obtained is humuline.

Another extract is obtained from hops, by placing them either in a powdered or whole state in a closed cylinder, and submitting them to the action of steam; by the partial condensation of the steam a liquid extract of hops is obtained, the watery particles of which may be evaporated until it becomes of the same consistence as the humuline.

ON THE RECOVERY OF GOLD AND SILVER FROM THE LIQUIDS EMPLOYED IN ELECTRO-GILDING AND SILVERING.

BY PROF. BOLLEY.

It is well known that the cyanogen compounds of gold, when dissolved in an excess of cyanide of potassium, resist the action of most precipitants, even of sulphuretted hydrogen. The separation of the gold cannot be effected by the humid process, and on this account various propositions have been made by Böttcher, Hessenberg, Elsner, &c., for evaporating the liquid to dryness, adding an equal quantity of litharge, melting at a strong red heat, and dissolving out the lead with dilute nitric acid, by which means the gold remains as a spongy powder. Wimmer has recently proposed mixing the dry residue of evaporation with one and a half times its weight of nitrate of potash, projecting the mixture in small quantities into a red hot crucible, and keeping up the heat until the whole mass is in quiet fusion. The first method is open to no other objection than the necessity for a high temperature and the consumption of nitric acid; the second method, on the contrary, is very uncertain and troublesome to conduct. There is scarcely any substance, which, when heated with nitrate of potash, detonates so violently as cyanide of potassium, and when the quantity of mixture projected into the crucible, is but a little too great, the loss is not inconsiderable.

The following method admits of being adopted on a very small scale, and with no greater heat than that of a gas-lamp:—The dry residue of evaporation is mixed with an equal quantity of chloride of ammonium and gently heated. The ammoniacal salts decompose the cyanides, cyanide of ammonium being formed and volatilized while the acid of the ammoniacal salt combines with the oxide of the metal contained in the cyanide. In the present case there are formed chloride of potassium; when ferrocyanide of potassium is used, chloride of iron and chloride of gold. The latter is readily decomposed, metallic gold being separated, the former, at least partially, with separation of oxide of iron in beautiful crystalline spangles. The chloride of potassium and undecomposed chloride of iron may be separated by water. The gold then remains as a coherent porous mass. When there is any

reason to suppose that gold has been removed with the oxide of iron, this may be treated with nitro-hydrochloric acid, and the gold precipitated, by means of protosulphate of iron. In most instances, however, this is unnecessary.

This process furnishes results sufficiently accurate to admit of its being applied to the determination of gold in electro-gilding solutions.

The same method may be adopted for silver solutions. There is then obtained, besides oxide of iron, chloride of silver, which may be extracted by ammonia; only a small quantity of metallic silver is ever separated, and that may be extracted by nitric acid. The silver may be obtained from the ignited mass by ordinary processes of smelting; but, as the precipitation of silver from the silvering liquids may be effected by sulphuretted hydrogen, this process will perhaps be more rarely adopted.

Lastly, it may be worth mentioning, that this process may be employed for estimating the percentage of metal present in the liquid used for electro-deposition. In the case of cupreous liquids it is advisable to substitute sulphate of ammonia for the chloride, because the chloride of copper is partially volatilized with the ammoniacal vapours.—*Schweizerisches Gewerbeblatt, January*, 1853.

ON THE SUPPOSED CONVERSION OF AMMONIA INTO NITRIC ACID IN THE ANIMAL ORGANISM.

BY CHRISTIAN JAFFÉ.

A series of experiments have recently been made known by Dr. Bence Jones, from which it is inferred that after introducing into the stomach a large quantity of ammoniacal compounds, nitric acid appears in the urine as a product of their oxidation.

From the extreme apparent improbability that such an oxidation could be effected in the animal organism, and at the instigation of Professor Lehmann, the author has repeated the experiments upon which this inference is founded, and has come to the conclusion that the method which Dr. Bence Jones adopted for detecting the presence of nitric acid in the urine is altogether inapplicable, and consequently that the inference that ammonia is oxidized within the organism is perfectly unfounded.

The method consists in distilling the somewhat concentrated urine with concentrated sulphuric acid until about one-half or two-thirds have passed over, treating the distillate with carbonate of potash, evaporating and testing the residue for nitric acid, by means of starch, iodide of potassium, and dilute hydrochloric acid, or with indigo.

The author believes that this process is inapplicable, because, even admitting the presence of nitric acid, it would appear impossible to distil over this acid in the presence of urea, or indeed any other organic substance. In order to decide this point the author added a few drops of nitric acid to normal urine, concentrated by evaporation, and then distilled with sulphuric acid. The distillate treated with starch and iodide of potassium, gave a reaction, which although readily accounted for by subsequent experiments, at first led the author to form the erroneous opinion that a distillation of undecomposed nitric acid from urine actually took place. Normal urine distilled with concentrated sulphuric acid gave a liquid which became intensely blue when treated with starch and iodide of potassium, while at the same time it gave no indication of nitric acid with protosulphate of iron. It soon became evident that this reaction was altogether owing to the presence of sulphurous acid formed by the action of the sulphuric acid upon the organic substances, and which, as is well known, causes a separation of iodine. It thus becomes easily intelligible why Dr. Bence Jones so seldom obtained this reaction in normal urine, as he saturated the distillate with carbonate of potash, and evaporated.

The presence of sulphurous acid in the distillate and the dependence of the reaction upon it was demonstrated in the following manner:

In the first instance normal urine was distilled without any addition of acid, and, as was to be expected, the distillate gave no reaction. Normal urine was then distilled with sulphuric acid; the distillate gave a reaction with starch and iodide of potassium; when tested with protochloride of tin for sulphurous acid it acquired a yellow colour, but even on boiling no precipitate was formed, a result which might fairly be attributed to the small quantity of sulphurous acid. In order to prove more decisively that the reaction was owing to this small quantity of sulphurous

acid, normal urine was distilled with phosphoric instead of sulphuric acid, and the distillate when tested did not give the slightest trace of a reaction. Lastly, when a distillate which at first gave the reaction was allowed to stand twenty-four hours, it no longer gave it, but the presence of sulphuric acid could be distinctly ascertained.

Thus then it appears that an oxidation of ammonia to nitric acid in the animal organism has not by any means been proved by Dr. Bence Jones's experiments. It remained, therefore, necessary to ascertain by some other means whether such a formation of nitric acid really took place. For this purpose concentrated urine was distilled with phosphoric acid, and the distillate did not give the slightest reaction either with starch and iodide of potassium or with protosulphate of iron.

After these results the author considers it unnecessary to enter more fully upon the consideration of the various deductions from Dr. Bence Jones's experiments; such, for instance, as the assumed formation of nitric acid from urea introduced into the stomach, especially as Frerich has already proved that this is always attended by an increase in the quantity of urea in the urine.—*Journal für praktische Chemie*, June, 1853.

CHLORIDE OF ZINC AS A SOLVENT FOR COPPER.

Chloride of zinc dissolves copper but not silver. It may therefore be employed as a means of separating filings of these metals, or of restoring the surface of plated copper which has been heated as in soldering. In this case the silver sinks into the copper and does not become visible until the outer surface of copper is dissolved off. —*Polytechn. Notizblatt.* 1853. No. 1.

IMPROVEMENTS IN DEPOSITING ALLOYS OF METALS.

(*Morris and Johnson's Patent, enrolled June* 11.)

To obtain the deposition of brass by galvanic agency, the patentees use a bath composed as follows:—one pound of commercial carbonate of ammonia, one pound of cyanide of potassium, two ounces of cyanide of copper, one ounce of cyanide of zinc, dissolved in one gallon of water. If the copper comes down too strongly, which is indicated by a too red appearance of the deposited metal, add carbonate of ammonia; if, on the contrary, the too pale appearance of the deposit indicates a too rapid deposit of zinc, add cyanide of potassium.

To obtain the deposition of German silver, the patentees use carbonate of ammonia and cyanide of potassium as for brass, with the addition of the cyanides or other compounds of nickel, copper, and zinc, in the requisite proportions to form the particular kind of German silver required.

IMPROVED MEANS OF PRODUCING OR OBTAINING AMMONIACAL SALTS.

(*W. Hunt's Patent, dated September* 30, 1852.)

The object of this invention is to obtain sulphate of ammonia from the ammoniacal liquors of gas-works, and this is effected by causing the liquors to traverse a column or condenser filled with pebbles and coke, and to be brought in contact with sulphurous acid gas, which may be obtained by calcining pyrites of any description, so as to drive off the sulphur therefrom. The sulphurous gas may be introduced at the top of the column, and descend with the falling liquid, or at the bottom, and be drawn upwards by the draught of a high chimney; in either case care being taken to cool the gas previous to its coming in contact with the ammoniacal liquor. The result of the action of the gas is to convert the ammonia present to a sulphite of that base from which the sulphite may be obtained by subsequent evaporation and exposure to air, by which oxidation will be induced and the chemical change effected.

Instead of using sulphurous acid gas, the spare gas from vitriol chambers, which consists of a mixture of sulphuric, sulphurous, and nitric acid, may be advantageously employed. The claims are for—

1. The apparatus described, or any modification thereof, wherein the ammoniacal liquors are treated with sulphurous acid; and

2. The application of the spare gas from vitriol chambers in the production of salts of ammonia.—*Mechanics' Magazine.*

IMPROVED COMPOSITIONS FOR PREVENTING THE OXIDATION OF METALS, &c.

(*Cook's Patent, enrolled June* 29.)

The metallic surface to be preserved from oxidation, such as iron vessels, &c., is to be first coated with a composition prepared as follows:—Dissolve 2lbs. of shellac, 8ozs. of seedlac, 8ozs. of gum benzoin, and 8ozs. of gamboge in one gallon of spirit of wine or wood naphtha, then add 8ozs. of gum arabic, and lastly 1lb. of red lead. Mix these ingredients well together, and apply by means of a brush to the metallic surface to be preserved. When dry give two coatings of the following composition: Dissolve 1lb. of French verdigris in spirit of wine and add to the former composition, and to the mixture add 1½lb. of oxide of zinc.

IMPROVED CEMENT FOR RESISTING FIRE.

(*Beale's Patent, enrolled July* 6.)

Take 60 parts of chalk, 20 parts of limestone or lime, 20 parts of salt, 10 parts of Barnsey sand in dust, 5 parts of iron dust or filings, and 5 parts of blue or red clay. Mix these materials well together, reduce to powder, and calcine.

ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION,

Held at Boston, August 24th, 25th, and 26th, 1853.

This meeting was attended by delegates from Philadelphia, New York, Baltimore, Bsoton, Cincinnati, Portland, Richmond, Bennington, Terre Haute, Great Falls, Newburyport, Fitchburg, &c. The reports of the Treasurer and of the Executive Committee were presented. The latter contained a variety of recommendations, which were separately considered. First, The appointment of local Secretaries in the large towns of the several States, for facilitating correspondence and diffusing information. (Referred to a Special Committee.) Second, The appointment of a Special Committee for the collection and arrangement of the statistics of Pharmacy in the United States. (A Committee of five was appointed.) Third, The appointment of a Committee to prepare an Address to the Pharmaceutists of the whole country, pointing out the difficulties attending the prosecution of study by Apprentices and Assistants, and encouraging the brethren to extend reasonable aid to those in their service: also recommending attention to preliminary education. Fourth, The adoption of a single definite name to denote a qualified practitioner of Pharmacy. (The term Pharmacian was suggested, but on objection being made, was withdrawn.) Fifth, The extensive issue of a cheap edition of the Pharmacopœia. (Referred by resolution to the Committee of Revision and Publication of the United States Pharmacopœial Convention of 1850.) Sixth, The suggestion of appropriate subjects for prize essays. (Postponed.) Seventh, The appointment of a Committee to inquire into the nature, extent, and locality of *home adulterations*, and propose a remedy. (Adopted). Eighth, The consideration of the subject of State and Municipal laws in relation to controlling the trade in drugs and medicines. (Postponed.)

The Committee on the Sale of Poisons presented a detailed report, in which a review was taken of the state of the law on this subject in the several States of America, in Great Britain, Prussia, France, &c. From this report it appears that absolute free trade in poisons prevails in most of the American States. It is reported, that in Vermont, "the regular Druggists take generally the proper precautions, but at nearly all the little stores of the villages throughout the State, arsenic, opium, and even strychnia are sold without being labelled." The following is an extract from the report:—

"We have reason to believe that a large proportion of the strychnia made, is used to poison wolves and other carnivorous wild animals in the newly-settled territories where the population is sparse. It is generally admitted, that the sale of arsenic by Druggists in the Atlantic cities has increased many fold within ten years. The quantity is vastly too great for use as a poison, and we believe the demand is chiefly attributable to the requirements of new branches of manufactures, and, perhaps, by wool-growers. In reference to strychnia, the increased use of which is directly attri-

butable to the pioneers and hunters of our extensive and rapidly peopling territories, both for the purposes of the fur trade and protection from dangerous carnivora, it may be stated that from the best data the Committee can arrive at, between 5000 and 6000 ounces are manufactured annually in this country, from about 120,000lbs. of nux vomica, besides what is imported; and that one manufacturer in Philadelphia, in the year ending June 3, made 1840 ounces from about 40,000lbs. of that drug."

The report contains a copy of a law passed in Ohio soon after the passing of the Arsenic Act in this country, and adopting some of its provisions; among others, the mixture of soot or indigo with arsenic when sold in small quantities. In New York and New Hampshire, laws are in force relating to the precautions to be taken in selling poisons, the use of labels with the word poison, &c. The Committee recommend the voluntary adoption of suitable precautions by Druggists and Apothecaries in the event of the Legislature being inactive.

On discussion of this report, of which the above is a very brief abstract, the following resolution was passed:

Resolved, "That this Association, in view of the loose manner in which the sale of arsenic is conducted in this country, earnestly recommend to the Pharmaceutical bodies, where these exist, and to Druggists and Pharmaceutists in general in other places, that the several Legislatures in those states where no law on the subject exists, be petitioned to pass laws confining the sale of this poison to Apothecaries, Druggists, and Physicians, or to such other persons as shall be specially licensed by law, who shall be required to keep a record of such sales; that such sales shall not be made to minors or servants unless they be properly authorized by a written order from a responsible person; that all bottles or packages shall be distinctly labelled with the name of the poison and the word POISON prominently marked on it; and, finally, that any sale of arsenic followed by an accident, in which these precautions have been neglected, be considered a misdemeanor, and punishable by legal process."

The report of the proceedings being rather voluminous, we select the following from among the resolutions brought forward:

Ordered, "That a Committee of three be appointed to inquire into the expediency of obtaining a form of certificate of membership, for the use of this Association, with such insignia, or device, or otherwise, as shall, in their opinion, be deemed suitable, and report their doings at the next Annual Meeting."

Resolved, "That a Committee of three be appointed to consider the feasibility of forming a Benevolent Fund for the relief of such Members of this Association as may need its aid; and if they consider it feasible that they recommend such means for raising and rules for governing the proposed fund, as they may deem suitable, and report to the next Annual Meeting."

The following resolution was proposed: "That this Association recommend to each State of the Union to enact such a law as will require every person offering for sale any patent or secret medicine designed and recommended as a remedial agent, to file in the proper office of each State wherein such remedy is offered for sale, a full and complete formula of such remedy, and that under oath. Moreover, to require such persons so offering such goods for sale or agency, or otherwise, to obtain from the proper authority of such State or each county thereof, a general or special licence, allowing such agent or proprietor only such privileges as other pedlars enjoy."

After some discussion the resolution was modified, and it was

Resolved, "That this Association recommend to each State the enactment of such a law as shall require every person engaged in the manufacture and sale of any patent or secret medicine, designed or recommended for exhibition as a remedial agent, to file in the proper office of each State wherein such remedy is offered for sale, a full and complete formula for such remedy, and that under oath; and moreover, to require such manufacturer, &c., offering goods for sale or agency, or otherwise, to conform to such State laws as regulate the levying of tax or excise upon all who engage in the business of buying and selling merchandize."

The following were also adopted:—

Resolved, "That the American Pharmaceutical Association believe that the use and sale of secret or quack medicines is wrong in principle, and is in practice attended with injurious effects to both the profession and the public at large, and believe it to be the duty of every conscientious Druggist to discourage their use."

Resolved, "That this Association earnestly recommend to our Pharmaceutical

brethren to discourage by every honourable means the use of these nostrums; to refrain from recommending them to their customers; not to use any means of bringing them into public notice; not to manufacture or to have manufactured any medicine the composition of which is not made public; and to use every opportunity of exposing the evils attending their use, and the false means which are employed to induce their consumption."

Resolved, "That we believe the drug law was never designed to exclude foreign secret or quack medicines through the Custom-house, nor do we believe this justifiable, however *desirable*."

Resolutions were passed respecting the mode of inspecting and examining drugs at the custom-house, and recommending that only graduates of Pharmacy or persons possessing certificates of qualification from some recognized College of Pharmacy, should be appointed as special examiners.

The Convention adjourned to meet at Cincinnati, Ohio, on the last Tuesday in July, 1854.

FATAL ACCIDENT FROM THE EXPLOSION OF NAPHTHA.

A FRIGHTFUL accident, by which three lives were lost, occurred on the premises of Messrs. Smith, Druggists, of Magdalen Street, Norwich, on Friday, Sept. 30. From the report in the *Norfolk Chronicle and Norwich Gazette*, it appears that on Friday afternoon Mr. Smith received an order from Mr. Andrews, a druggist of that city, for two gallons of naphtha. Mr. Smith delivered the order to one of his assistants, Robt. Curtiss, with strict injunctions that the naphtha should be got out of the summer-house, where it was kept, before dark. Curtiss directed the warehouseman, H. Nichols, to do so; but he being busy at the time, or having neglected his duty, did not go for the naphtha till nearly seven o'clock in the evening, when he went, accompanied by the carter, John Godbolt, and an errand boy, Thomas Lamb. They entered the summer-house, now used as a warehouse for inflammable articles, taking with them the safety-lamp (a ship lantern) used on the premises. When they entered it would appear that they closed the door, which fastened on the inside with a spring lock, so that it could not be opened from the outside. The warehouse contained several carboys of naphtha, oils, and other inflammable articles; and it is supposed that Nichols was in the act of pouring naphtha from a carboy into a vessel held by Godbolt, while the boy held the lamp; that the carboy slipped, and in falling knocked down and broke the lamp, and the explosion was the result. Godbolt and Lamb, it is supposed, expired in a few minutes from suffocation. The shopman hearing the explosion, and seeing the warehouse in flames, instantly gave the alarm of fire, and Mr. Smith ran to the spot and saw Nichols climbing up the window, and having broken a pane of glass, was struggling to get out. By this means the poor fellow escaped suffocation, but only to suffer a more lingering death. With the prompt assistance of the neighbours he was extricated and conveyed to the hospital. He lingered till half-past four in the morning, when he expired. Godbolt and the boy were found quite dead. On Saturday morning Mr. Wilde held an inquest on the bodies of John Godbolt and Thomas Lamb; and the evidence of Robert Curtiss, assistant to Messrs. Smith, having been taken, the jury returned a verdict of "Accidental death from the ignition of naphtha." In the evening another inquest was held on the body of Henry Nichols, when a similar verdict was returned.

A parish meeting has been held to raise a subscription for the widow of Nichols and her children, and about £150 has been received.

REVIEW.

A MANUAL OF MATERIA MEDICA AND THERAPEUTICS, *including the Preparations of the Pharmacopœias of London, Edinburgh, and Dublin, with many new Medicines.* By J. FORBES ROYLE, M.D., F.R.S. Small 8vo, pp. 801. Second edition. London: John Churchill, Princes Street, Soho. 1853.

THE appearance of a new edition of the above work will be gladly welcomed by the student of Materia Medica, for since the former was out of print, the want of a work on this subject, which should form an introduction to the more detailed treatises, has been much felt. From the known talent of the author, we were led to expect that this edition, even more than the first, would supply this desideratum, and in this hope we have not been disappointed, for the work as it now stands forms

an excellent epitome of Materia Medica. The important subject of Therapeutics, however, is not treated much in detail. This want will not be felt by the Pharmaceutical student, but to the medical student it must diminish in some degree the value of the work. The necessity of comprising the subjects treated of within certain limits, has obliged the author, as he states, thus to curtail the therapeutical portion.

The author expresses himself much indebted to Mr. F. W. Headland for most valuable assistance in the preparation of this edition, as also for his process of making Aconitina, and for new articles on the Cinchona Alkaloids, on Chloroform, and on Cod-Liver Oil.

In the Indian Department of the Great Exhibition specimens of Aconitina were exhibited by Mr. F. W. Headland (and noticed by us, vol. xi., p. 108), made by the improved process, which is here fully described. It differs from that of the London Pharmacopœia of 1836 in the evaporation of the spirituous solution to a thin syrup instead of to an extract—in avoiding the repetition of the precipitation, filtration, and washing of the alkaloid, and in dispensing altogether with the use of animal charcoal. So difficult has it been found to obtain Aconitina by means of the old process, that a large portion of the substance sold under that name is almost inert. This was the experience of Dr. Pereira, who states that he had swallowed a grain without any perceptible effect.

The following is an outline of Mr. Headland's process :—Take of the root of *Aconitum ferox*, coarsely bruised, two pounds ; and three gallons of *rectified spirit*. Boil the aconite with a gallon of the spirit for an hour in a retort with a receiver adapted to it. Pour off the spirit. Boil the residue with another gallon, and with that which distilled over. Pour off again; and do the same a third time. Press the root, and mix the solutions. Filter. Distil off the spirit from the tincture thus obtained until this is of the consistence of thin syrup ; then pour it out of the retort, and mix with twice its bulk of *distilled water*, and excess of *sulphuric acid*. Filter carefully from the precipitate produced, until it is quite clear. Then again evaporate gently in a water-bath to the consistence of syrup. Pour this syrupy liquid, which should not exceed two fluid ounces in measure, into a stoppered bottle of which it shall occupy about one-third. Add then an excess of strong solution of *Ammonia*, and shake gently. To the white mass produced add an equal bulk of pure *æther*. Insert the stopper tightly, and, holding the bottle in a damp cloth, with a finger on the stopper, shake briskly for a few minutes. Allow then a sufficient time for the æther to rise above the water, and when it has completely separated, remove the stopper, and take up carefully the æthereal solution from the surface of the water with a pipette or common glass syringe. Pour it into an open basin ; again shake up the watery solution with another equal bulk of *æther*, and remove this in the same manner. Do the same a third time; let the æthereal solution evaporate spontaneously. The aconitina is deposited.

It will be observed that *Aconitum ferox* is used instead of *Aconitum Napellus;* the former containing a much larger quantity of the alkaloid than the latter. We understand that Mr. Headland intends applying the same formula to the evolution of other vegetable principles.

Among the changes introduced in this edition we notice a tabular arrangement of the Mineral Materia Medica, and for the full characters of the Natural families which were given in the former edition a tabular arrangement has been substituted. These tables have been drawn up by Mr. Headland. That of the Mineral Materia Medica appears to have been arranged with great care, and will no doubt be found very useful to the student. In the tabular arrangement of the natural families a few inaccuracies occur, and among some others we notice the following; for instance, the *Polygaleæ* are described as having a papilionaceous corolla: this is incorrect, the flowers (including under this term both calyx and corolla), may be called falsely papilionaceous ; but the wings in this case belong to the calyx, while in the *Leguminosæ* the wings belong to the corolla, and the corolla is thus by itself papilionaceous, which is not the case in the *Polygaleæ*. Again, the *Ranunculaceæ* can scarcely be said to be distinguished in one point from the *Magnoliaceæ* by their quinary flowers, since they often have quaternary, or even ternary ones like them ; one of the best marks of distinction between these orders would have been to have tabulated the *Ranunculaceæ* as destitute of stipules, and the *Magnoliaceæ* as possessing large convolute ones. Again, the *Scrophularineæ* are described as having

didynamous stamens, whereas, although this is commonly the case, some plants of the order have but two, and the genus *Verbascum* included by Dr. Royle in the body of the work in this order has five stamens. Again, the *Solanaceæ* are mentioned as having a plaited corolla, whereas many of them have a valvate one, as, for instance, the genus *Solanum;* indeed, this difference in the æstivation of the corolla of the *Solanaceæ* forms one character by which the order is divided into tribes; thus the tribe *Solaneæ* is distinguished by its valvate æstivation, and the *Atropeæ* while in bud by its plaited. Again, the *Acoraceæ* are placed in a division of the *Endogenæ*, which is essentially characterized in the table by the absence of a perianth: this order is also again mentioned as having naked flowers: the only plant, however, described in the work as belonging to it, namely, the *Acorus Calamus*, has a scaly perianth.

This edition has been carefully remodelled by Dr. Royle, and brought up to the present state of our knowledge of Materia Medica. In some cases the articles have been almost entirely re-written, as for instance, those on Cinchona, Balsam of Peru, and many others. Dr. Royle has named the plant called by the late Dr. Pereira the *Myrospermum of Sonsonate*, as *Myrospermum Pereiræ*, and we hope with him that all botanists will agree in adopting this name. This plant, as the readers of the Pharmaceutical Journal will remember, was described by Dr. Pereira as the source of the Balsam of Peru, as well as of two other medicinal products, namely, White Balsam and Balsamito. The latter is described by Dr. Royle as prepared by digesting in rum the inner part of the fruit of the above plant ; but this is not quite correct, for the Balsamito is prepared by digesting in rum the fruit merely deprived of its winged appendages.

The preparations of the London, Edinburgh, and Dublin Pharmacopœias have been with few exceptions given with great accuracy. Among the errors we have observed, we notice the following : Thus the formulæ for *Enema Opii*, *L. E.* are described as similar, whereas the *Enema Opii*, *E.* is twice or four times the strength of that ordered by the London College. *Unguentum Gallæ Compositum*, *L.* is described as similar to the *Unguentum Gallæ et Opii*, *E.;* but the latter contains *four* times as much *opium*, and *twice* as much powdered *galls* as the former; it is therefore a much stronger anodyne, and also a more astringent application.

The *Tinctura Opii* of the three Pharmacopœias is described as possessing the same strength; but this is not quite correct, the Dublin tincture being rather weaker, as the avoirdupois weights are there employed instead of the troy weights, as used in the London and Edinburgh tinctures. Again in the formulæ for *Mistura Ferri composita*, *L. E. D.*, the *sugar* is altogether omitted. Also in the formulæ for *Pilula Aloes cum Sapone*, *L.*, and *Pilula Aloes*, *E.*, the quantities of the ingredients to be used have been omitted. With these few exceptions, after a careful comparison of the preparations as given in this work with those of the three Pharmacopœias, we have detected nothing of importance.

In the portion of the work treating of the Parts and Products of Plants, with their Classification, and which is intended as an introduction to the Vegetable Materia Medica, we could have wished that more care had been employed in its compilation. Thus, a *compound fruit* is defined as being formed out of several flowers ; this is the definition of a *collective fruit*, for a compound fruit may be formed, as well as a simple fruit, out of a single flower. The *seed* again does not necessarily contain *albumen*, as here stated, neither is it always attached by a *funiculus* to the inside of the ovary, for both the *albumen* and *funiculus* may, and frequently are, absent. Again, the Flowerless or Cryptogamic plants are described as being destitute of *organs of fructification;* and indeed the whole description of this class is somewhat indefinite, and scarcely up to the present state of our knowledge on the subject. Again, why should Dr. Royle give a list of the known plants as given by De Candolle in 1830, when Dr. Lindley has published more than twenty years later, a table containing nearly twice as many species as were then enumerated. Although we have thought it right to make the above few criticisms, yet it will be seen that they do not interfere with the value of the work as a text-book of Materia Medica, and as such we recommend it to the Pharmaceutical and Medical Student as the best work on Materia Medica for its size in this country.

In conclusion, we may observe that much credit is due to the enterprising publisher, Mr. Churchill, and Mr. Bagg the artist, for the admirable manner in which the work has been got up.

BOOKS RECEIVED.

The Elements of Materia Medica and Therapeutics. By Jonathan Pereira, M.D., F.R.S., & L.S., &c., &c. Third Edition, enlarged and improved, including Notices of most of the Medicinal Substances in Use in the Civilized World, and forming an Encyclopædia of Materia Medica. Vol. ii. part 2. London: printed for Longman, Brown, Green, and Longman, 1853.

Memoirs of John Abernethy, F.R.S., *with a View of his Lectures, Writings, and Character.* By George Macilwain, F.R.C.S., author of "Medicine and Surgery one Inductive Science." In two vols., 8vo. London: Hurst and Blackett, Publishers, successors to Henry Colburn, 1853.

Hand-Book of Organic Analysis; *containing a Detailed Account of the Various Methods used in Determining the Elementary Composition of Organic Substances.* By Justus Liebig. Edited by A. W, Hofmann, Ph.D., F.R.S., &c., illustrated by 85 wood engravings. London: Walton and Maberly, 8vo., pp. 134, 1853.

A Practical Treatise on Sea-Bathing and Sea-Air. By George Hartwiy, M.D. London: Samuel Highley, Jun., Fleet Street, 1853.

Transactions of the Medical and Physical Society of Bombay. No. 1, New series. For the years 1851 and 1852. Bombay: printed at the Bombay Education Society's Press, 1853.

The Medical Chronicle, *or Montreal Monthly Journal of Medicine and Surgery.* Edited by William Wright, M.D., and D. C. MacCallum, M.D. Montreal: printed by Moore, Owler, and Stevenson, 1853.

The Chemist, *a Monthly Journal of Chemical and Physical Science.* Edited by J. and C. Watt. New series, No. 1. London: S. Highley, Fleet Street.

TO CORRESPONDENTS.

Sigma (Manchester).—*Ternitrate of Alumina* is prepared by saturating nitric acid with hydrate of alumina—crystallizes, but with difficulty, in thin colourless laminæ, and generally remains in the form of a tenaceous gummy mass, when the solution is evaporated. The *Basic nitrate* separates as a pasty mass when the above salt is decomposed by ammonia.—*Berzelius and Gmelin.*

An Associate (Newbury).—(1.) Cochineal is used for staining ivory red, but we are unable to give the details of the process.—(2.) *Sumbul.* See vol. vii., page 546, and vol. xi., pages 144 and 358.—(3.) Chloroform should be kept in a cool place, and in the dark. The proportion of camphor in camphorated chloroform is arbitrary; sometimes it is a saturated solution.

A Dispenser (Spilsby).—(1.) In making *Pilula aloes cum Myrrha*, the saffron should be used in powder.—(2.) *Essence of Camphor.* See vol. viii., pages 196 and 241.

Union should apply, by letter, to the Secretary, 17, Bloomsbury Square.

Aqua (Exeter) (1.)—should refer to any work on Chemistry.—(2.) The work mentioned is a useful one.

W. W. (Dundee).—Dr. Golding Bird's Elements of Natural Philosophy, published by Churchill, 12*s.* 6*d.*

Amalgam (North Shields).—Faraday's Experimental Researches in Electricity; Noad's Lectures on Electricity; Lardner's and Walker's Manual of Electricity.

Mr. Searley's letter has been received, and the information it contains will be of service.

A Member (Shropshire).—The statement is entirely without foundation.

J. R. (Islington).—Rub the spermaceti into powder and triturate it with the mucilage added gradually; mix the alkali with the water and add it by degrees. Mucilage will not form so good a mixture with spermaceti as yolk of egg.

We have received a letter from Dr. Daniell, dated Sierra Leone, announcing his intention to favour us with papers on subjects which he is investigating, relating to Materia Medica.

E. W. (London).—Liq. Plumbi diacetatis, P. L., forms an opalescent mixture with distilled water.

A Student (Settle).—A solution of caoutchouc is sold by Mackintosh makers and others cheaper than any that can be made in a small quantity. Oil of turpentine is a solvent.

T. A. R. (Conway).—Battley's liquor opii sed. is not liable to become mouldy.

A Pharmacien (Manchester).—The treatment of the disease in question does not come within the province of the Pharmaceutical Chemist.

A. (London).—The term liq. antim. tart. denotes a preparation not in the present Pharmacopœia.

Adolescens (Liskeard).—We are unable to give any satisfactory information respecting the state of the drug trade in Australia.

Spero.—See vol. xii., p. 314, or write to Mr. Redwood, 17, Bloomsbury Square, with name and address.

A. P. S. should write to the Secretary about the certificate.

Alpha (Surgeon-Dentist).—We cannot answer the question.

J. H. and *B. W.* (Windsor).—See page 200.

A. P. S. (East Norfolk) mentions the case of an errand-boy who applied for a situation as a Dispensing Assistant. Not being authenticated we cannot use the letter.

An Impostor.—A correspondent, who has given his name, requests us to caution our readers respecting a person who has imposed upon him and others under the name of J. Holmes, referring to a Mr. Rymer, supposed to be an accomplice, on whose recommendation he was engaged as an Assistant. On the day of his arrival he was so intoxicated that his immediate discharge was necessary, at the cost of a month's salary and back fare.

G. (Cheltenham).—(1.) There is a difference of opinion as to the part of sarsaparilla containing the greatest amount of activity.—(2.) There is also a difference of opinion as to whether spirit or water should be employed for extracting the active constituents of ergot of rye. Bonjean's *ergotine* is extracted with water.

J. A. (Peterborough).—Palm oil is readily decolourized by exposure in the fluid state to the joint action of air and water in shallow vessels. It may also be decolourized with chromic acid.

W. A. (Thirsk).—*German yeast* is the yeast formed in making Bavarian beer, from which the liquor is pressed.

J. B. G.—(1.) We are not aware that St. Fabian's nettle is used in medicine in this country.—(2.) We presume deficient supply is the cause of the increased price of mastich.—(3.) Liquid.

Mr. C. Rutter (Shaftesbury)—would be much obliged by any hints from readers of this Journal as to the best construction of, and the best fuel for, a small wind furnace, where sufficient heat is required to fuse the less tractable metals. Also plans for a self-acting bellows, and a self-acting blowpipe.

A. P. S. (London).—Heat is evolved when a mixture of plaster of Paris solidifies, in consequence of the water parting with its latent heat as it becomes solid.

Brighton.—(1.) There is no chemical action.—(2.) See the cover of this Journal.—(3.) An examination and diploma.—(4.) Yes.—(5.) The solution of chloroform in spirit, commonly called chloric ether, is not an ether.

An Associate (Hoxton).—(1.) The distinction referred to between "equivalent" and "atomic weight," has originated in a difference of opinion as to the atomic weights of hydrogen and some other elements. Some Chemists represent an equivalent of hydrogen as two atoms.—(2.) The same.

Hydrotheion.—(1.) In the experiment referred to, the results were influenced by the impurity of the solutions used to represent the two sorts of sugar.—(2.) In applying Liebig's test for prussic acid, after adding the sulphuret of ammonium, heat should be applied until sulphur is deposited, and no more undecomposed sulphuret remains. The addition of a persalt of iron to the filtered liquor will then give the required reaction.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. VI.—DECEMBER 1st, 1853.

PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY BY A MEMBER OF THE COUNCIL.

We stated last month in allusion to the fruits of discord, that the crisis of the dispute in the Pharmaceutical Society was over. At the time of writing we believed this to be the case, as the opinion of the legal advisers of the Society had pointed out the course to be taken, and sanctioned that which had been done. It appears, however, that we were mistaken. About the time of going to press we received a copy of a case and opinion which had been taken, as we supposed, with a view of justifying the hostile proceedings of Mr. Dickinson, and which is incorporated with his statement, but we did not at that time interpret it as a declaration of war.

We had not fathomed the depth of the zeal and energy with which the attack upon the Society is prosecuted, and notwithstanding the language which had been resorted to, we did not anticipate that any Member of the Society, much less a Member of the Council, would proceed to the extremity of an appeal to the Court of Queen's Bench. Truly has Mr. Dickinson stated that the Council, by carrying the Bye-laws into effect, "lay themselves open to proceedings from any factious Member who may wish to embarrass the Council." He has proved the truth of his assertion by commencing such proceedings himself.

The folly of litigation, except in cases of absolute necessity, is admitted by all sensible men.

To what extent and for what purpose such necessity exists in the present instance may be gathered from the tone of the plaintiff's pamphlet. The sincere personal animosity and vindictive spirit which characterise this production, show it to be one which ought not to be taken for granted without due caution; but the unfounded statements and misrepresentations which we shall presently point out, give it a complexion of which we leave our readers to form their own judgment. Not satisfied with the resolution of the Council to publish his letter of Nov. 2, which he calls an "explanation," he has embodied the same in a pamphlet of forty-eight pages, which he has forwarded to our publisher for insertion as an advertisement.

This compilation is, as the author admits, "penned in the exercise of no little ingenuity," and, although some of the statements it contains are so obviously fabulous as scarcely to require refutation, the tenor of the document might lead a person unacquainted with the facts of the case to infer, that the author had been exerting himself to promote the interests of the Society, while his colleagues had been bent upon its destruction, that they had designedly and knowingly betrayed their trust, and that they had been the aggressors in a malicious attack upon him.

The Council abstain at the present time from publishing any comments upon the so called "explanation," involving as it does certain legal questions on which proceedings are pending in a Court of Law, and on which, therefore, it would not be proper at the present time to embark in any controversy. For the same reason we abstain from any argument founded on the legal merits or peculiarities of the case, and confine our observations to plain matters of fact.

So far as the question of legality is concerned, it is sufficient to state that authorities are at issue with regard to the legal construction of certain provisions in the Pharmacy Act. Under Bye-laws sanctioned by the legal advisers of the Society and confirmed as the Act directs, the Council have admitted several hundred persons as Members, whom they are bound to protect in the enjoyment of all the rights and privileges of membership, unless and until their title to such rights and privileges has been set aside in a Court of Law. However successful

may be this defence, other questions have been raised which may involve the Society in further litigation, and although the Council may be supported on every point by competent legal authority, the uncertainty of the law is proverbial, and no man can *positively* state beforehand what will be the decision in any case. A counsel's opinion is nothing more than an opinion until it has been tested in a Court of Law, and when two or more authorities are at variance, it is a matter of opinion which is most to be relied upon. Favourable opinions having been obtained on behalf of the Society sanctioning the Bye-laws, which in the judgment of the Members at large are in accordance with its objects and highly important to its interests, it might have been expected that this would have been sufficient to satisfy all parties. It appears extraordinary that a Member who testified his approval of the Bye-laws in question, by seconding their confirmation, is not satisfied with the legal opinions which sanction such approval, but has gone out of his way to seek and obtain adverse opinions, grasping at every doubtful point which can be made available for involving the Society in litigation.

When a person takes upon himself the office of public prosecutor against an institution in which he professes to take a warm interest, it might be supposed that the object and tendency of such proceedings would be to benefit that institution, to save it from injury and promote its prosperity. Any other supposition would imply the existence of motives at variance with the professions.

The policy of the Council which is thus attacked has been fully considered and discussed by the Members, who have, with a few exceptions, given it their cordial support. It consists in extending the basis of the Society and continuing its operations in a manner consistent with the course which has been pursued since its formation. The Bye-laws adopted with this view have received legal sanction, and in the absence of any decision to the contrary in a Court of Law, have full force and effect.

The object and tendency of the proceedings of Mr. Dickinson may be briefly stated to be (see *pamphlet*, page 43):

First, The expulsion from the Society of all the Members elected under the Bye-laws without examination since the date of the Act (about 800), involving the return of the entrance-fees and subscriptions of these Members for the current year (2400 guineas), with the loss of their future subscriptions and good offices as promoters of the objects of the Society, and the loss of their influence with their Assistants and Apprentices, whom it is desirable to attract to the Board of Examiners, with a view to admission as future Members.

Secondly, The invalidation of all the existing Bye-laws, which, if sustained, would cause great embarrassment.

Thirdly, The reduction of the resources of the Society to a very considerable extent, by dispensing with the condition upon which those who were Members at the date of the Act, were admitted to the privilege of registration.

The third object is not included in the case now before the Court of Queen's Bench, but is on the programme of the plaintiff.

Such are the results, for the attainment of which a Member of the Council has voluntarily, perseveringly, and in the exercise of no little ingenuity, dragged the Society before the Court of Queen's Bench, and entered upon a campaign which must, under any circumstances, be attended with heavy expenses, unpleasant feeling among the Members, and all the evils inseparable from litigation among persons whose interests and influence are dependent upon their unity.

In justification of these proceedings, Mr. Dickinson accuses the Council of wilfully betraying their trust, and makes the following assertion on the subject of the conference of a Committee with Mr. Tidd Pratt on the 20th of September:

"This Committee did meet, and learnt from their legal adviser the truths which they have so studiously withheld from the majority of the Council, and which now are attempted to be kept from your knowledge, namely, that the demand of a registration fee is illegal, that the Bye-laws of November, 1852, are wholly void, and in

fact, that every point which I have contended for respecting the illegal Bye-laws, could be sustained in a court of law."—*Pamphlet*, page 35.

The whole of this statement is a fiction, not having the slightest foundation in fact. He further asserts, that the attention of Mr. Tidd Pratt was not directed to the several objections which had been raised against the validity of the Bye-laws, and the adverse opinions which had been obtained respecting them. *This also is untrue.* These documents were laid before Mr. Tidd Pratt, who, on reviewing the evidence before him, with the Charter, the Act, and the Bye-laws of 1851, gave his opinion, that "the Bye-laws of June, 1853, confirmed and approved by a Special General Meeting of the Members, and by the Secretary of State for the Home Department, are *valid and legal*, and should be acted upon until they have been set aside "by the Court of Queen's Bench." In reference to the assertion that no written case was submitted to Mr. Tidd Pratt on the occasion of the settlement of the Bye-laws of November, we need only observe, that the Charter, the Act, and the Bye-laws of 1851, with the draft of the proposed Bye-laws, were submitted to him in writing and print, and that after full consideration and some verbal amendments, he signified his approval in writing. We might refer to numerous passages in the pamphlet, in which reflections and imputations of a similar nature are thrown upon the Council, for the purpose of inducing the impression that they have mismanaged the affairs of the Society, acted in open defiance of the law, sacrificed the interests which they were bound to protect—that in short they are responsible for the consequences of the proceedings which Mr. Dickinson has instituted. The Members will be able to judge for themselves whether the policy pursued by the Council, or that which is advocated by their opponent, is most calculated to carry out the objects of the Society, the Charter, and the Act, and whether it is likely that twenty Members whom they have elected as their representatives, would combine together fraudulently and designedly, to contravene an Act of Parliament, in obtaining which they have laboured for years. The author of the pamphlet arrogates to himself the exclusive claim to confidence as an impartial, *disinterested*, and judicious exponent of the law and administrator of justice.

But Mr. Dickinson emphatically and with apparent indignation denies that he has systematically opposed the Council or obstructed the business of the Society. If it be true that the Council are the degraded, servile, and dishonest men he represents them to be, why need he be ashamed or afraid to admit that he has been their opponent and obstructed their designs? He has been for several months an active member of a self-constituted committee, with legal advisers retained for the purpose of opposing the Bye-laws passed by the Council and Members. This committee have, by their opposition at the Home Office, succeeded in causing the delay of a month in the confirmation of the Bye-laws, which has occasioned much embarrassment, he is now proceeding to the extremity of an appeal to the Court of Queen's Bench, and yet he is indignant at the insinuation that he has been an opponent of the Council—of those men whom he represents as being a "packed" board, totally unfit for their office.

The following passage and the incident to which it refers, will serve as an illustration of the obstructive process and ingenuity in disguising the truth:

"These Bye-laws, prepared by you (the Council) were brought up to the meeting of the 11th of May last, to be confirmed or rejected in *their entirety*; no modification was permitted to be made, the President arbitrarily and unconstitutionally declaring to the meeting 'that the Bye-laws having been made and established by the Council, it was the business of the meeting either to reject them, or confirm and approve the same.' He explained that it was not competent for the meeting to initiate any new Bye-law."—*Pamphlet*, page 13.

In the page of the *Pharmaceutical Journal*, from which the above garbled quotation is taken, we find the declaration of the President to be as follows:

"He explained that it was not competent for the meeting to initiate any new Bye-law, the meeting deriving its legality under the provisions of the Act for con-

firming and approving; if it should be the pleasure of the meeting to confirm and approve of the Bye-laws by one resolution, after they were read by the Secretary, it could do so; if it should be preferred the Bye-laws should be taken separately or by sections, that course might be adopted."

The report proceeds thus:

"It was proposed by Mr. Bell that each section of the Bye-laws should be considered separately, to which Mr. Dickinson objected, observing, that the Bye-laws were so connected that they must be considered together."

"Mr. Philpot moved that the Bye-laws be rejected, but withdrew the motion on Mr. Bastick proposing that they should be read entire and afterwards discussed as a whole."

Mr. Dickinson proceeds in his statement:

"At this meeting various useful and practical suggestions and amendments were offered, and without alleging any reason for their refusal, they were wholly rejected, and the Bye-laws, as originally framed by you, were passed on the motion of *one of your own body, duly seconded by another.*"

The reason alleged, under legal advice, was that the meeting had no power to adopt the suggestions, but could simply *approve* or *reject singly* or *as a whole* the Bye-laws prepared by the Council. If the proposal to consider the Bye-laws by sections had been adopted, the meeting might have rejected any one or more of the Bye-laws and confirmed the remainder. This course would not have obstructed the business of the Society. It was, however, opposed, not by the President, as Mr. Dickinson states, but by Messrs. Dickinson and Bastick. Several of the suggestions made at the meeting were generally approved, and might have been proposed and carried at an early meeting of the Council, confirmed at a future Special General Meeting, and afterwards by the Secretary of State. This would have been the regular course of proceeding, but it would not have obstructed the business of the Society. The appeal to the Secretary of State, with *suggestions* for alterations in the Bye-laws, did obstruct the business of the Society, and *could not by possibility have effected any other object*, the Secretary of State having no power to adopt such suggestions, but simply to confirm or refuse to confirm. Instead of tending towards the result professedly desired, namely, the adoption of the suggestions, the tendency of this hostile appeal was to cut off the only means by which such result could be attained, by causing delay in the confirmation of the Bye-laws and the consequent suspension of business.

The pretence that these and other proceedings to which we have adverted are not correctly regarded as a systematic opposition to the decisions of the Council, and an obstruction of the business of the Society, is not only unintelligible but entirely irreconcilable with the arguments and allegations put forth in justification of such proceedings. Among these allegations the most extraordinary is the assertion that the Council have been the aggressors! that they have thrown the first stone, assailed Mr. Dickinson's character, impeached his honour, and threatened him with expulsion from the Society, and that he is *therefore obliged*, in vindication of himself, to drag the Society into a court of law. Even if it could be believed that twenty men, being representatives of a Society, would unite in a "base and unmanly attack" on a colleague for the purpose of "damaging his reputation" and with a view to his expulsion, it remains to be shown on what principle this would justify him in an attack upon the Society, and in seeking vengeance by the endeavour to procure the expulsion of 800 other Members.

But the assertion that the Council have been the aggressors has no foundation in fact. That they have exercised much forbearance and did not desire to expel Mr. Dickinson from the Society, but on the contrary have used all their endeavours to avoid the necessity for that extreme measure, is well known by the Members. It has always been a source of regret that so much energy and de-

termination, which might have been of essential service to the Society if exerted in its behalf, should have been wasted in the endeavour to conjure up and magnify doubts founded on legal technicalities as a pretext for opposition.

In case any of our readers should be misled by the assertions respecting the alleged "base and unmanly attack" on the part of the Council, we may briefly trace the origin and progress of the existing disagreement. In the year 1850 Mr. Dickinson became connected with a secret committee, who published an anonymous circular, complaining of the existing arrangements with regard to the official circulation of the Pharmaceutical Journal among the Members, objecting to the name of the editor being on the cover, and proposing the publication of the Transactions of the Society under the superintendence of a committee. A deputation afterwards attended the Council to remonstrate on the subject, on which occasion Mr. Dickinson made a severe personal attack upon the editor, who, instead of taking offence, interpreted the movement as an indication of a disposition on the part of the Members to assist in contributing materials for publication, and anxious to promote this object he proposed and supported the election of Messrs. Dickinson and Bastick as Members of the Council, in order that their views might be fairly represented and entertained. As soon as the Pharmacy Act was passed, the editor removed his name from the cover of the Journal in deference to the objections which had been raised by Mr. Dickinson and a few other Members, and urged upon the Council the more official supervision of the Transactions of the Society by the Members of the Library and Museum Committee.

The proceedings of the Council-chamber are sacred, but we are justified in stating that from the establishment of the Society up to the time to which we refer, harmony prevailed in the Council, and when differences of opinion occurred the discussions were always conducted in a gentlemanly manner and with a friendly spirit. We can also positively affirm that no disposition has ever existed to treat with discourtesy any newly-elected Members of the Council, or to slight the suggestions and wishes of those who might happen to be in a minority on any questions. It has, on the contrary, been the desire of the old Members to "infuse new blood into the Council," and thus to take advantage of the abilities and awaken the interest of fresh supporters for the benefit of the Society.

In Jan., 1852, Messrs. Bastick and Dickinson became the editors of the *Annals of Pharmacy*, in which they from time to time made severe personal attacks upon the editor of this Journal, who studiously abstained from rejoinder or recrimination, and resisted every effort which was made to goad him into a dispute. By degrees the acrimony of these attacks increased, and not only the editor but the President and Council were charged with dishonesty, imbecility, corruption, and falsehood. The authors of these calumnies were at the same time acting on a self-appointed committee, employing legal advisers, and adopting the measures to which we have already adverted for frustrating the decisions and obstructing the proceedings of the Council.

Such was the aspect of affairs when the Council took the step which has been termed an aggression, and which consisted in calling a meeting of the Members, reading to them a few of the slanderous passages which had been published against them, reporting the embarrassments which had been occasioned by the opposition to the Bye-laws, and taking the sense of the meeting on the subject. The Council have entered into no controversy on the legal questions which have been raised. Pending an appeal to a Court of Law, they were precluded from so doing. They have, nevertheless, published in the Transactions of the Society Mr. Dickinson's "Explanation," thus granting him the indulgence of giving currency to his version of the case, but reserving their own explanation of the circumstances which have been represented by him to their disadvantage in his *ex parte* statement.

There is one passage in the pamphlet which tends to throw some light on the

subject, by explaining what is the real source of annoyance: "No, gentlemen, it is not that the Council are anxious for you to be registered; it is Mr. Jacob Bell who requires your assistance as *Members*, so that his Journal may have 650 more subscribers, and his remuneration be *pro tanto* increased." The wilful inaccuracy of this assertion will be seen from the following facts. The Pharmaceutical Journal is not a pecuniary speculation. It has never paid the expenses of publication, and never can under the existing arrangement with the Society. It is neither the desire nor the intention of the Editor to derive any income or remuneration from the Journal, nor would the addition of 650 to the list of Members tend to promote this end, as the Journal is supplied to the Society under prime cost. The Pharmaceutical Journal was commenced for the sole purpose of assisting in the establishment of the Society, by furnishing a regular medium of communication among the Members, and it has been continued with no other object. A vote is passed by the Council every month for the purchase of the number of copies required. The Editor neither derives any pecuniary advantage from the transaction, nor desires a continuance of the arrangement, unless it be, in the opinion of the Members, beneficial to the Society. The vote can be negatived at any time, without notice, at the option of the Members. It is not true that the Council have no control over the contents of the Journal. No portion of the *Transactions of the Society* is published without authority; and even the Editorial articles, for which the Editor is responsible, are generally submitted for revision to other Members of the Council when they relate to the business of the Society. The reports of general meetings, resolutions of Council, and explanatory statements, are revised and sanctioned by the President, Vice-President, and other Members of the Committee, the reports of Scientific Meetings are prepared by the Professor of Chemistry and Pharmacy, and the lists of Members, &c., by the Secretary. The Editor has never condescended to parry the insults and low abuse with which he has been personally favoured, and which are nothing more than a harmless effervescence; but he considers it to be his duty to vindicate the character and advocate the interest of the Society when assailed by persons who are pursuing a reckless course tending towards its destruction. The endeavour to throw discredit on the Council and impose upon the Members by the unscrupulous assertion above quoted cannot fail to recoil upon the author, as the observation serves to explain the grounds of his anxiety to procure the expulsion of so many Members.

The "exercise of no little ingenuity" is manifested in the artifice resorted to for attacking an individual through the medium of his own personal friends and coadjutors, as the following passage from the pamphlet, among many others, will serve to show:—

"I have published to the world that there are not three independent men among them (the Council), because they know that they owe their position as Members of the Council to the influence of one man, aided by their own servants, who are his nominees; and that if they were to act independently of him and them, they would be driven ignominiously from the offices which they enjoy; but that if they were to stand up courageously for their rights, they would soon reduce to subjection *their* petty tyrant."

This is a mere invention promulgated for the purpose of exciting jealousy and discord in the Council, by a man who boasts of having proposed to transfer £500 to the Benevolent Fund as a bond of union, which money he is now wasting in litigation.

The author of the pamphlet selects as his motto—

> "The purest treasure mortal times afford
> Is spotless reputation, &c.
> * * * *
> Mine honour is my life, both grow in one;
> Take honour from me, and my life is done."—*Richard II.*

Coupling this motto with the production to which it is appended and the antecedents, it would appear that the passage was written by Shakspeare for the exclusive use of Mr. Dickinson. The other Members of the Council are not allowed to participate in the sentiment. Their reputation and honour may be assailed with impunity by virtue of the "*license of the public press*," which is an "*individual right*;" but if they presume to read the libels published against them at a public meeting, and to take the sense of the meeting on the subject, the ghost of Shakspeare rises up, and enjoins them to respect the *honour* and *spotless reputation* of the author of those libels.

A RULE NISI IN THE COURT OF QUEEN'S BENCH.

In answer to the application of Mr. Dickinson for advice as to the kind of process most likely to answer his purpose in his attack upon the Pharmaceutical Society, Mr. Lloyd furnished him with three suggestions, which, although not warranted sound, were recommended as being worthy of a trial. (*Pamphlet*, page 42, 6th Answer.)

The first of these expedients was tried in the Court of Queen's Bench on the 24th of November, and a rule *nisi* has been granted, as stated in the subjoined report, extracted from the *Times* of November 25th.

A rule *nisi* is usually granted as a matter of course on a *primâ facie* case being shown by the appellants. In the present instance the rule was not granted exactly in the form desired; but we think it will answer the purpose rather better. The argument upon the case will take place on a future day.

The Attorney-General and Mr. Bramwell are retained on behalf of the Society.

THE QUEEN V. THE REGISTRAR OF THE PHARMACEUTICAL SOCIETY OF LONDON.

Sir Fitzroy Kelly (with whom was Mr. H. Lloyd), moved for a rule calling upon the Registrar of the Pharmaceutical Society of London to show cause why a *mandamus* should not issue, commanding him to remove the names of certain parties from the register of the Society. The object of the application was, to try the right of certain persons to have their names on the register. In order to obviate the evils which had arisen from ignorant and unqualified persons practising as Chemists and Druggists, the Pharmaceutical Society was established in the year 1842. This Society in the following year obtained a Charter of Incorporation, by which the qualifications of Members were defined; and subsequently, in the year 1852, an Act of Parliament was passed, which confirmed the Charter. The question now intended to be raised was, whether any persons were entitled to be on the register of the Society, except, first, those who were Members at the time when the Act passed; and, secondly, those who afterwards underwent an examination and obtained a certificate of qualification?

Lord Campbell expressed a doubt whether the Court could grant a *mandamus* to remove those names. The Court had refused a *mandamus* to take off a seal of a corporation.

Sir F. Kelly said, the Act of Parliament was imperative in requiring the registrar "to make out and maintain a complete register of persons being Members of the said Society; but it appeared that as many as 650 persons had been improperly entered without having obtained a certificate of qualification.

Lord Campbell said, it was quite clear the learned counsel could not have a rule in the terms prayed; but he might take one in the terms of the Act of Parliament, commanding the party to make and maintain a complete register.

Sir F. Kelly said, it was considered a great evil that these unqualified persons* should be on the register, and very unjust; also, to those Members who had undergone the examination.

Rule *nisi* granted in the terms of the Act.

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* The new Members will, without doubt, appreciate the compliment, as it must be recollected that they have passed quite as severe an examination as the person who has employed Sir Fitzroy Kelly to "damage their reputation," and that they have all been certified to be duly qualified for admission as Members of the Society, which he has not.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL,

held on Wednesday, November 2nd, it was

Resolved, "That the Pharmaceutical Meetings be in future held on the *first* Wednesday in the month, instead of the second.

The following letter was read:—

"*November* 1*st*, 1853.

"Sir,—I beg to acknowledge the receipt of your letter of the 6th ult., calling my attention to, and enclosing an extract from, the Minutes of the Council of the Pharmaceutical Society, which consists of a resolution requiring my explanation with regard to certain passages published in the *Annals of Pharmacy*. I will thank you to inform the Council that I do not recognize the right assumed by their resolution to demand from me any *such* "explanation."

"I am, Sir, your obedient Servant,
"William Bastick,
"2, Brook Street.

"*To* Mr. G. W. Smith, *Secretary to the Pharmaceutical Society*."

It was Resolved, "That the letter of Mr. Bastick, dated November 1, just read, be entered on the Minutes, and be published in the Transactions of the Society, in the forthcoming number of the *Pharmaceutical Journal*."

The President stated that he had received the following letter, addressed to him in his official capacity, by Mr. Bastick:—

"*October* 13, 1853.

"Sir,—I find to my surprise after what has occurred that I am summoned to attend the Board of Examiners this month. As I have great reason to believe that it was the intention of the Council to remove me from that Board, and that they have not done so simply because they found that they had not the power, I beg to inform you that I shall offer only* any obstacle to the fulfilment of their intentions; and that, in furtherance of this determination, I shall absent myself from the Board unless or until I receive an assurance from you or the Council that I have misconstrued their intentions.

"I feel myself at liberty to consult the wishes of the Council and my personal feelings in this matter, because having been elected by them to office I ought to retire when my services are no longer in demand, and, moreover, I consider that they ought to have the power of removing at once any servant of the Institution.

"I have troubled you with this explanation of my intentions, as from your position as President of the Society you must be well acquainted with the intentions of the Council, and as I thought that you would favour me with the information sought for my guidance especially. I have no hostile object in seeking it.

"I am, Sir, your obedient Servant,
"Wm. Bastick,
"2, Brook Street, Bond Street.

"*To* Henry Deane, Esq., *President of the Pharmaceutical Society*."

Mr. Dickinson then, in accordance with the resolution of the Council of October 6th, offered his explanation, which he read to the Council, and moved,

"That the letter of Mr. Dickinson just read be entered on the Minutes and be published in the Transactions of the Society in the forthcoming number of the *Pharmaceutical Journal*."—Mr. Dickinson then retired.

After some discussion, it was

Resolved, "That in the opinion of this Council the explanation offered by Mr. William Dickinson is not satisfactory."

Resolved, "That a Committee be appointed to consider the explanation of Mr. Dickinson, with power to print the same, with such remarks as they may think

* This is obviously a clerical error, *offer only* instead of *not offer*.

requisite for the information of the Members of the Society; and that the President and Vice-President, Messrs. Squire, Hooper, Bell, Sandford, Garden, Bird, and George Edwards, do constitute that Committee."

Mr. Bastick's letters were then taken into consideration, and it was

Resolved, "That while the Council entertain the same decided opinion of the conduct of Mr. Bastick, as rendering him an unsuitable person to hold office in the Society, they also consider that his retirement from that office renders any further action in his case unnecessary."

AT A MEETING OF THE COMMITTEE

appointed to consider Mr. Dickinson's explanation, &c., the President reported, that having had occasion to confer with the legal advisers of the Society on business requiring immediate attention, he had also consulted them on the subject of Mr. Dickinson's letter, and the case and opinion comprised in it. It was their opinion that as the documents referred to involved certain questions which would shortly be submitted for adjudication in a Court of Law, it would be advisable for the Council not to enter into any controversy on the subject at the present time.

It was Resolved, "That in the opinion of this Committee it is advisable to publish Mr. Dickinson's explanation in the Transactions of the Society, reserving any comment thereon pending the result of proceedings threatened in a Court of Law."

SPECIAL GENERAL MEETING OF THE COUNCIL, NOVEMBER 9, 1853.

The President reported that a copy of the following notice had been served upon the Council of the Society, and also upon the Registrar :—

"To the President and Council of the Pharmaceutical Society of Great Britain;

"To the Registrar appointed under and by virtue of the Act of Parliament passed in the sixteenth year of the reign of Her Majesty Queen Victoria, entitled, 'An Act for regulating the Qualifications of Pharmaceutical Chemists, 15 and 16 Victoria, cap. 56;'

"To Mr. George Walter Smith, and to whomsoever else it may concern;

"Gentlemen,—I hereby give you notice that the names of all Chemists and Druggists, and other persons which may have been placed on the Register of Members of the Pharmaceutical Society of Great Britain since the passing of the above Act without such persons having passed the examination required or prescribed by the 10th section of the said Act, and the Bye-laws of the said Society, and without having paid the Fees prescribed by the Bye-laws of the said Society, commonly known as the Bye-laws of June, 1853, are illegally so placed on the said Register, and as a Member of the said Society, I hereby require you to remove the names of all such persons from the said Register.

"And I further give you notice, that unless such names be forthwith removed from the Register of Members of the said Society, that I shall take such proceedings against you as I may be advised, and shall hold you personally responsible for the consequences.

"And I hereby also give you notice not to place on the Register of 'Pharmaceutical Chemists,' or 'Pharmaceutists,' the name of any person who shall not have previously passed the examination prescribed by the said Act of Parliament and the Bye-laws of the said Society, and until they shall have paid the fee of ten pounds ten shillings. "I am, Gentlemen, your most obedient servant,

"WILLIAM DICKINSON.

"16, *Cambridge Street, Hyde Park.*"

The President, on the part of the Vice-President and himself, reported that they had communicated their instructions to the Registrar, authorising the registration of the names of the Members referred to in the above notice as Pharmaceutical Chemists.

Resolved, "That this Council approve and adopt the directions given by the President and Vice-President to the Registrar in reference to the Registers."

Resolved, "That the President and Vice-President be authorised to consult the legal advisers of the Society, and to take such steps in its defence as they may be advised."

The minutes of the Committee appointed by the Council on the 2nd of November to consider Mr. Dickinson's explanation, having been read—it was

Resolved, "That the explanation of Mr. Dickinson be published in the Transactions of the Society in the ensuing number of the *Pharmaceutical Journal*, but pending the result of legal proceedings against this Society, it is advisable for the Council to reserve any comments thereon until the termination of such proceedings; and that the notices which have been served on the Council and the Registrar be also published, with copies of the Resolutions which have been passed on the subject."

TO THE PRESIDENT AND COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

GENTLEMEN,—

I beg to acknowledge the receipt of a letter from your Secretary, dated Oct. 6th, 1853, enclosing the document, of which the following is a copy:—

"PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

"(*Extract of Minutes of the Council, held on the 5th day of October*, 1853.)

"Resolved—That Mr. William Dickinson be called upon to explain his conduct as a Member of the Council, in his systematic opposition to its decisions, and his endeavours to obstruct the business of the Society, by joining in a hostile appeal to the Secretary of State, in defiance of the provisions of the Charter, line 96 to 101.

"The explanation of Mr. Wm. Dickinson is also required with regard to the following passages, published in a periodical entitled 'Annals of Pharmacy,' edited by Wm. Bastick and Wm. Dickinson:—

"'Annals of Pharmacy,' July, 1853, *vide* No. xix. page 210, lines 34 to 42.

"'Annals of Pharmacy,' August, 1853, *vide* No. xx. page 243. Article entitled 'The Council and Bye-laws of the Pharmaceutical Society,' to the end.

"*Vide* No. xx. page 256. Answer to 'Henry Cripps, Devises,' 'Ajax,' 'Bosh.'

"Note.—A copy of the 'Annals of Pharmacy,' numbers 19 and 20, accompany this, the portions referred to being marked."

You require me to explain my conduct as a Member of the Council.

I presume the Council adopts the present course in virtue of rule 1, sec. xvii., page 24, of the "Bye-laws:"—

"Every Member of Council who shall commit any act or acts which appear to the Council derogatory to the honour of his office, shall give an explanation of the same to the Council, on being required so to do, and in default thereof, or if such explanation be unsatisfactory to the Members present, he shall be liable to the censure of the Council; or if it be deemed expedient, a notice may be given by any Member of the Council for a motion of removal from the Society of the Member so offending, which notice shall be inserted in the summons for the ensuing meetings of the Council until disposed of, and shall be taken into consideration at the first ensuing meeting of the Council at which twelve Members thereof shall be present."

I beg, *in limine*, to protest against the power you have assumed to compel me to notice this communication.

It is both informal and irregular, and I deny your right to call me to account, either as a Member of the Council, or of the Society, without specific charges being brought against me.

To waive, however, all preliminary objections, I will endeavour to address myself to the purport and intention of the above resolution.

I. I am "called upon to explain my conduct as a Member of the Council for my [alleged] systematic opposition to its decisions."

II. For "my [alleged] endeavours to obstruct the business of the Society by joining in a hostile appeal to the Secretary of State in defiance of the forms of the Charter, line 96 to 101."

III. This charge has reference to certain articles and paragraphs inserted in certain numbers of the "Annals of Pharmacy."

I propose to notice these points in their proper order.

I. I beg most distinctly and emphatically to deny that I have raised, or been

party or privy to, a "systematic opposition to the decisions of the Council;" and I demand an explanation of what you mean by a "systematic opposition," and an explicit statement of each particular case referred to, that I may have the opportunity of refuting those calumnious assertions *seriatim*.

I will, however, avail myself of the present opportunity to record a few of the leading subjects discussed at the meetings of the Council at which I, as a Member of that Board, have had, not only the right to vote, but freely to express my opinions.

1. I have consistently and continuously advocated the expediency of the Pharmaceutical Society publishing their own transactions, and have reprobated the monthly purchase of the journal of a private individual, as an act of injustice to the whole Pharmaceutical community, and a proceeding calculated, eventually, to be the means of destroying the good that would otherwise arise from the exertions of this Council. I refrain, for obvious reasons, in this place, from making any observations on the use that has been made of the Society's Journal by a Member of the Council, as a vehicle for his own private views.

2. I advocated the advantage and usefulness of the library, if made circulating; and I may, without arrogance, assert that my exertions on that question largely contributed to obtain this boon for the Members of the Society.

3. I have urged the necessity of increasing the benevolent fund by legitimate means; that is, by appropriating a portion of the Members' subscriptions annually to that purpose, and so create in each Member a feeling of permanent interest in the Institution.

4. My views upon the publication of lectures are known, for which I have to thank the Editor of the *Pharmaceutical Journal*. I have maintained that the publication in the Transactions of the Society, of lectures which have been delivered in the Institution, would be an act of justice towards the country Members, who, from their position, are unable to visit the Society's house, even once a year. But, at the same time, being fully aware of the difficulty of giving a report of educational lectures with the same effect as when delivered *vivâ voce*, I have also advocated that an educational course of lectures should cease, and that popular lectures, on subjects pertaining to Pharmacy and Chemistry, should be given by eminent men, so remunerated that the copyright should be vested in the Society. By such publication in the Transactions of the Society, every Member would participate in the advantages accruing from the money spent under this head, which has amounted, in the aggregate, as you and the Members well know, to a very large sum. I also assisted on a Committee, appointed to specially consider the lecture question, which Committee reported and recommended that the lectures should be free to the Members, Associates, and registered Apprentices of the Society, and also that they should cease when the courses then about to be delivered were completed. The Council adopted that report, and *resolved*—"That the Secretary deliver cards of admission to the several courses of lectures to Members, Associates, and registered Apprentices, on application, free of charge."—[*Pharmaceutical Journal*, vol. xi., p. 151.]

5. I have advocated the necessity of the Society giving up the Educational portion of its establishment, not only from the enormous pecuniary loss arising therefrom, but also from the admitted and established fact, that the functions of education and examination are considered incompatible, by the highest authority; more especially when the examination is conducted, and the diplomas or certificates are granted, under an Act of Parliament. The School, it is stated, in your Journal, "has always been a heavy drain upon the funds of the Society."—[*Pharmaceutical Journal*, vol. xi., p. 98.]

6. The founding of a Pharmaceutical medal, to be given by the Council of the Society, as a reward for proficiency and research in the various sciences relating to the practice of Pharmacy, is a proceeding which I can claim the honour of having first introduced to the notice of the Council; and it affords me some little gratification to be able to mention here that the Council adopted the proposition without a dissentient voice.

7. On the Pharmacy Act I was mainly instrumental in making the voting clause, what, doubtless, it was intended to be, but which it was not—a clause that would make voting by proxy a reality.

8. I have opposed the admission of gentlemen on the register of "Pharmaceutical

Chemists" who were not Members of the Society at the time of the passing of the Act, or who have not passed the Major examination and paid the usual fees.

Previous to the passing of the Pharmacy Act, the Charter and the then subsisting Bye-laws did not contemplate the establishment of the new "Order" of "Pharmaceutical Chemists." These Bye-laws were in force until May, 1853, at which date the present Bye-laws came into force. The title of "Pharmaceutical Chemist" and the "register" were established by the Pharmacy Act. The Act is explicit. By the 6th section, the privilege of being registered as a Pharmaceutical Chemist, and of assuming that title, is *exclusively* restricted to the then *Members of the Society;* and the 10th section points out how other Chemists and Druggists might enjoy the same privileges—namely, by passing the prescribed examination and paying the fees. All persons, therefore, whether in business or not, before or after the date of the Charter (February 18, 1843), before or after the passing of the Act (June 30, 1852), not *Members* of the Society, *must*, by this section, submit to the ordeal of an examination, and pay the fees, before they can be registered as "Pharmaceutical Chemists," or assume the title, or even become registered Members of the Society.

The 12th section expressly declares that from the 30th June, 1852, it shall not be lawful for *any* person not being then (namely, June 30, 1852) duly registered as a Pharmaceutical Chemist, according to the provisions of the Act, to assume or use the title of Pharmaceutical Chemist or Pharmaceutist in any part of Great Britain, or to assume, use, or exhibit any name, title or sign, implying that he is registered under this Act, or that he is a Member of the Society.

On these three clauses of the Pharmacy Act I take my stand, and declare any infraction of them illegal and unconstitutional.

But it has been asserted that power is given, by the 2nd section of this Act, to the Council "to make and establish new and additional Bye-laws, as they shall deem proper and necessary." This is true; but the clause continues, "for the purposes *contemplated* by the Charter, or by this Act, to be approved by a general meeting, &c." But as the Charter did not at all contemplate the registering of Chemists and Druggists as "Pharmaceutical Chemists," and the Act recognized those only who were actually Members of the Society on the 30th June, 1852, and after that, such as should pass an examination, and pay the fees, the Council were not enabled to frame a law to meet cases not *contemplated* by the Charter or Act. Do the Council suppose that this clause enables them to make laws, which would, in fact, modify, control, or supersede the Act?—Impossible.

The Council, however, did proceed to take the unconstitutional course of announcing to Chemists and Druggists, *after* the passing of the Act, that those who had commenced business after the date of the Charter (February 18, 1843), and prior to the passing of the Act (June 30, 1852), on applying before May, 1853, might have their names placed on the register of Pharmaceutical Chemists, and be admitted Members of the Society on payment of three guineas.

Seeing that such a proceeding would be contrary to the express provisions of the Act, I felt it my duty to point out to the Council that they would be acting illegally. To enable them to carry out the admission of these gentlemen on the lower scale of fees, and without examination, and to redeem their pledge made to several who had accepted the invitation, the Bye-laws of November, 1852, were prepared. These, I was told, had been submitted to counsel, and that "proper legal authority" had declared that it would meet the difficulty suggested. I seconded the resolution, adopting the Bye-laws at the special meeting, under the impression that the alleged legal opinion was to be relied on, and it is brought against me, as an accusation, that I now oppose my own resolution.—[*Pharmaceutical Journal*, vol. xiii., p. 153.]

Gentlemen, you have not the courage to tell the whole truth. I soon discovered that the Bye-laws in question did not meet the difficulty, and subsequently I protested against the admission of Members under these Bye-laws, and stated my reasons. This protest I now again repeat.

The very Bye-law itself under which you propose to act does not name or empower you to register these gentlemen as PHARMACEUTICAL CHEMISTS, but you take the power under this Bye-law to register these gentlemen as "CHEMISTS AND DRUGGISTS, certified to be duly qualified for admission as members of the Society." Yet even this power is denied you by the 12th section of the Pharmacy Act. And even yet further it is Mr. J. H. Lloyd's unqualified opinion that the Bye-law is wholly void.

Having committed yourselves, you submit a case, and take the written opinion of Mr. Tidd Pratt, on the legality of your proceedings, which we are given to understand he had already sanctioned. No person could expect Mr. Pratt, knowingly, to contradict himself. The opinion, nevertheless, bears a contradiction on the face of it. Had you exercised common prudence and taken the opinion, as I have done, of some barrister, of well-established reputation, you would have received a very different reply on your case. Mr. J. H. Lloyd is my authority, and I forward you the case and his opinion.

It is high time that the 650 gentlemen [*Pharmaceutical Journal*, vol. xiii., p. 146] who have applied to have their names entered on the register of Pharmaceutical Chemists should be apprized of their true position and legal status. I was perfectly aware that my opposition would render me unpopular with the few hundreds to whom this boon was offered; and had that opposition been only factious, I should have allowed this to pass, and endeavoured to conciliate this section of members; but I will not sacrifice principle to expediency. The proceeding is illegal; the Council have no more right to remit the examination fees of these 650 gentlemen, than they have of future applicants. By so doing they lay themselves open to proceedings by any factious Member who might wish to embarrass the Council. If it were thought expedient to admit these gentlemen on the reduced scale of fees, the Council should have proceeded in a legal manner, and have sought additional powers, and not act in direct defiance of an Act of Parliament. Gentlemen, if it is your determination to act thus illegally, and make us, as a Council, liable for pecuniary payments, it shall not be without protest on my part.

Gentlemen, I ask what reply you could make to an order from the Court of Queen's Bench to show cause why the names of 650 gentlemen, *as persons not duly qualified to call themselves Pharmaceutical Chemists*, should not be struck off the register of Pharmaceutical Chemists? To avoid the disgraceful exposure of these gentlemen in their several localities, and actions for damages being brought against yourselves, you would be obliged to present to each of them a diploma or certificate of their having passed an examination (*pro formâ*), and to pay the Society £7 7*s.* out of your own private purses, to make up the full amount of fees due on the registration of each of these gentlemen. And, on the other hand, in what a humiliating position would you be placed, were the registrar to be served with a mandamus, issuing from the Court of Queen's Bench, directing him to put in force the penal clause of the Pharmacy Act, against each of the 650 gentlemen who had assumed the title and emblems of a "Pharmaceutical Chemist" without proper qualifications.

These are matters of too serious importance (and involving consequences which threaten the very existence of the Society) to be treated with levity, or designated as "a quibble about words" [*Pharmaceutical Journal*, vol. xiii., p. 146], or "minor differences on matters of detail" [p. 145].

9. I have also legally and constitutionally opposed in the Council, and out of it, the introduction, into the present Bye-laws, of a rule making compulsory an annual payment of £1 1*s.* as a registration fee, by Chemists and Druggists, who were members of the Society and were Pharmaceutical Chemists on the 30th June, 1852, by virtue of the 6th section of the Pharmacy Act. Failing to pay such annual sum, you assume the power to strike off the register of Pharmaceutical Chemists the names of such defaulters. The effect of such clause, if it could be enforced, would be to compel these Members to contribute to the funds of the Society as long as they carried on business, whether they approved of the Society or not, the mode of conducting its affairs, or the application of its revenue.

"It was originally the intention of the promoters of the Act to admit every individual, already in business, to the privilege of registration."—[Report of a Meeting of the Chemists and Druggists of the Counties of Warwick, &c. See Mr. Bell's speech. London: Churchill, 1852, p. 14.] Had this clause been allowed by the Committee of the House of Commons, every Chemist and Druggist throughout Great Britain would also, by the present Bye-laws, have been called upon to contribute the annual fee of £1 1*s.* to the funds of the Society *nolens volens*, under pain of being struck off the register of Pharmaceutical Chemists; a demand they could have successfully resisted.

I am perfectly aware that the Society must be supported by an adequate amount of subscriptions, but what I have contended for is, that those funds should be levied in a legal manner.

My objections to the Bye-law are twofold.

First—That it is illegal. The Council or Registrar has no power to strike the name of such defaulter from off the Register of Pharmaceutical Chemists.

The 6th section of the Pharmacy Act secures him the privilege of registration, and once placed on that register, nothing short of another Act of Parliament can disqualify him.

Secondly—It is impolitic and ridiculous to publish and make a Bye-law which is inoperative. You may be placing yourselves in the awkward dilemma of being called upon to put into effect this Bye-law and find it to be a dead letter.

10. I have also supported, at the general meeting of May last, the suggestions of the Members residing at Dover, for making certain other modifications in the then proposed Bye-laws, which are enumerated in the extract from a letter which I shall in due course set forth. I think it highly desirable that the "balance-sheet" of the Society's expenditure and receipts should be laid before the Auditors, at least *two months* before the annual meeting, and that all the Members of the Society should have a power, at all seasonable hours, to inspect and take copies of such accounts. The Bye-laws were defective in this, and in other respects; and as a Member of the Council, equally accountable as yourselves for a proper application of the funds of the Society, I felt bound to afford to every Member of the Society, with whose monies we are entrusted, an opportunity of knowing how the funds of the Society have been applied, a sufficient time previous to every annual meeting, to enable him to be prepared to put such questions to us as he might think proper.

II. As to the second charge, I as distinctly and emphatically deny, "that I have endeavoured to obstruct the business of the Society, by joining in a hostile, or any other appeal, to the Secretary of State, in defiance of the forms of the Charter, line 96 to 101," or any rule or regulation of the Society, and I demand proofs of your gratuitous assertions.

I demand also to know what right you have to assign any sinister motives to my actions, without bringing forward proofs, to support your charge against me.

I might decline to enter into a consideration of this charge until such proofs be adduced; but as I did attend, as one of a deputation of Members of the Society upon the Secretary of State, previous to the confirmation of the new code of Bye-laws of the Society, a refusal on my part to offer an explanation might be misconstrued, and I am glad to have this opportunity of explaining my reasons for joining that deputation.

The object of the deputation named, was to point out to the Secretary of State the objections taken by Members of the Society to the Bye-laws as they then stood, for his confirmation. I attended as a *Member* of the Society, as one personally interested in its well-being and prosperity, anxious only that we should have legal and efficient Bye-laws, to guide our future proceedings.

I deny your right to interfere or call into question my privilege, as a *Member* of the Society, to attend any deputation or meeting I may think proper.

You are aware that throughout the period occupied in framing those Bye-laws, I did assert my right, as a Member of the Council, to express my opinions, and give my vote, on the various points brought before the meetings, on the form and effect of the proposed Bye-laws.

When I found myself in a minority, I always submitted, without observation; and I challenge any Member of the Council to point out when I have raised any factious opposition at any meeting of the Council.

The lines 96 to 101 of the Charter, referred to in the above resolution, are as follows:

"That at all general meetings and meetings of the Council, the majority of the Members present, having a right to vote thereat respectively, shall decide upon the matters propounded to such meetings, the person presiding therein having, in case of an equality of Members, a second, or casting vote."

Am I really to understand that it is in virtue of this clause that the Council are empowered to call me to an account for my actions? Are you, Gentlemen, prepared, as men of business, to assert, that because a Member is compelled, by virtue of the rules of the Society, at meetings, to yield to the majorities, he may not, therefore, openly and fearlessly express his sentiments on every subject propounded at such meetings, or take all legal and constitutional means out of doors, to comment upon such measures, and even organize combinations to subvert them? The rule cited is

common to all public and private Societies, and is not peculiar to our Association. Do we not daily see Members of Parliament, when their peculiar measures have been thrown out, even by large majorities, agitate and combine with others for the purpose of subverting the existing laws of the country, and season after season reproduce in the House the same measures for discussion? If, then, such a course be allowed to Members of the Legislature, when the peace of the empire is even at stake, why then should the Members of the Council of the Pharmaceutical Society be denied the same privilege? I claim for myself this privilege, and I assert it. I have law and reason on my side, and it is not your entreaties, or your threats of expulsion from the Society, which will induce me to alter my course, so long as abuses remain unreformed.

You will also remember that I protested against certain proposed rules as wholly illegal. My opinion on this point was supported by that of the eminent counsel and lawyer, Mr. Bramwell, who had advised on a case containing the facts, fully, clearly, and fairly stated, and accompanied by a copy of the Charter, the Pharmacy Act, and the proposed Bye-laws. Mr. Bramwell's opinion has been printed and circulated, and no person has ever yet come forward to show the fallacy of that opinion; on the contrary, it has been confirmed by another eminent counsel, Mr. J. H. Lloyd.

And now let me observe that you, as Council of this Society, have permitted a false and slanderous statement to appear in the Journal of the Society, to the effect that the case was unfairly and incorrectly stated [vol. xiii., p. 146]. The case contains a transcript of every clause and passage in the three documents mentioned, in any way affecting the questions at issue, accompanied by the documents themselves. You allege that the Bye-laws were "settled on competent legal authority" [vol. xiii., p. 146]. When the *written* "opinion of the competent legal authority" [p. 145] was publicly called for, it transpired that it was only a *verbal* opinion on a case stated in conversation with Mr. Tidd Pratt that was taken! If the Council think such a proceeding satisfactory, the Members of the Society can not.

These Bye-laws, prepared by you, were brought up to the meeting of the 11th of May last, to be confirmed or rejected in *their entirety;* no modification was permitted to be made, the President arbitrarily and unconstitutionally declaring to the meeting "that the Bye-laws having been made and established by the Council, it was the business of the meeting either to reject them, or confirm and approve the same." "He explained that it was not competent for the meeting to initiate any new Bye-law."—[*Pharmaceutical Journal*, vol. xii., p. 561.]

At this meeting various useful and practical suggestions and amendments were offered, and without alleging any reason for their refusal, they were wholly rejected, and the Bye-laws, as originally framed by you, were passed on the motion of *one of your own body, duly seconded by another.*

I now record the various points laid before Lord Palmerston by the deputation, and would ask any candid and impartial observer whether the course I, and those associated with me, have taken, can be construed into a "hostile appeal to the Secretary of State," or, as your Journal describes it, a "disgraceful exhibition of treachery and discord" [vol. xiii., p. 146], or "treacherous hostility" [p. 147].

That I should not be charged with a misstatement of what transpired at that meeting, and to explain what you, in your Journal, have thought proper to designate as "misrepresentations at the Home Office," and "an interference with the successful operation of the Pharmacy Act" [vol. xiii., p. 98], I beg to transcribe a passage from the letter of the solicitors of the deputation, addressed to the editors of the "Annals of Pharmacy," and published in that journal of August last, p. 253:

"Gentlemen—In answer to your communication of the 12th inst., we beg to forward to you, in as concise a manner as possible, the various points which were brought to the notice of Lord Palmerston as amendments to the then proposed Bye-laws of the Pharmaceutical Society of Great Britain, by the deputation of a Committee of Members of that Society, and which were embodied in a letter written by us to his Lordship, at his request.

"I. By Section I., Rule 4, 'Superintendents,' on being duly proposed and seconded, may, at the option of the Council, be elected as Members of the Pharmaceutical Society of Great Britain. The amendment suggested to his Lordship was in Rule 4, after 'Superintendents applying to be elected Members,' the words 'having passed the examination required of persons desirous of practising as Pharmaceutical Chemists' should be added, to avoid ambiguity.

"II. The Bye-laws impose an annual tax of £1 1*s.* on Members of the Society who are Pharmaceutical Chemists, by virtue of the 6th section of this Act, as a registration fee as Pharmaceutical Chemists, and on their failing to pay such annual imposition, their names are to be struck off the register of Pharmaceutical Chemists, which, if a legal proceeding, would compel every Member of the Society to continue his subscription to the Society for life, whether he approve of it or not.

"According to Mr. Bramwell's opinion, the Council or Registrar has no power whatever of striking the name of such defaulter from the list. This, then, being clearly illegal, it was proposed to alter the Bye-laws in the following manner, namely:—

"In Section I., Rule 7, by striking out 'a registration fee,' the clause would then read as follows: 'All Members, being such prior to the 1st day of July, 1853, not being life-members, shall pay an annual subscription-fee of one guinea, or in lieu, &c.' And as the payment of this annual subscription of Members is provided for by this rule, the Rule No. 13 in the same section should be struck out entirely, being a repetition; and by altering Rule 5, Section XI., by substituting the words 'members' for 'persons' in the first line, and in the last line substituting 'register of Members of the Society,' for 'register of Pharmaceutical Chemists,' the Bye-laws would then be in conformity with the spirit of the Act of Parliament, and assume a legal shape in this respect.

"III. It was suggested that a *single* fee of five shillings should be paid by each person desiring to have his name placed on the register of Pharmaceutical Chemists, as a registration fee. A rule was suggested to be added to the Bye-laws to that effect.

"IV. Section VIII., Rule 2. It was suggested that the balance-sheet should be prepared, and laid before the auditors, at least two months before the annual meeting. No time is specified by the Bye-laws as they now stand.

"V. Section XIII. That all Members should have a power, at all seasonable hours, to inspect and take copies of the accounts, fourteen days previous to the annual meeting, and a rule was suggested to meet this omission.

"VI. Section XX. That for the convenience of country Members who may wish to attend the annual or other general meetings, and enable them to come up to town and return the same day, it was suggested that all general meetings should be convened not before twelve o'clock, or later than two o'clock, P.M.

"The above, with a few verbal and immaterial alterations in the present Bye-laws, were submitted to Lord Palmerston for his consideration. We may mention here, that the various points were suggested at the general meeting of Members in May last.

"Another point urged before his Lordship was, that hitherto the London Members, by reason of additional facilities offered them of visiting the library and museum, &c., paid an annual subscription of £1 11*s.* 6*d.*; the proposed Bye-laws reduces the subscription of the London Members to £1 1*s.*, without making any corresponding reduction in favour of Country Members. * * * * * *

"We are, Gentlemen, your obedient servants,

(Signed) "PRICHARD AND COLLETTE.

"57, Lincoln's Inn-fields, 14th July, 1853."

My observations at the deputation were wholly confined to the points enumerated in the above extract; but I should observe, that severe strictures were made by one of the gentlemen present, on the anomalous position of Mr. Jacob Bell, in reference to the Journal of the Society; and also as to the use that had been made of its pages, which was wholly foreign to the purposes to which a Journal of a scientific Society should be exclusively dedicated; namely, to scientific and educational purposes, and a faithful and impartial record of the Society's transactions. While fully agreeing in all that the speaker then thought proper to allege, I am not, nor can I be made, responsible for the words and acts of others.

These, Gentlemen, are the points brought before the Secretary of State for his consideration, either to adopt partially or wholly, which you, Gentlemen, have thought proper in your Journal to designate as "frivolous—contradictory—sophistical—transparent—dishonest—fallacious—unintelligible—antagonistic to the progress of education—and calculated to drag down Pharmacy to its original level."—[*Pharmaceutical Journal, passim.*]

I will dare venture to assert that there is not one independent Member of the

Society who would not declare that the proposed modifications were both reasonable and necessary, and not "mere minor differences on matters of detail"—[*Pharmaceutical Journal*, vol. xiii., p. 145]—and that the epithets, "hostile," "treacherous," &c., are unseemly and uncalled for.

That I have endeavoured to obstruct the business of the Society, or interfere with the successful operation of the Pharmacy Act, by joining such deputation, are assertions wholly devoid of truth and reason.

That the business of the Society was delayed for want of the confirmation of the Bye-laws by the Secretary of State is true, but I had no control over his Lordship's appointments.

The proposed Bye-laws received the confirmation of the meeting of Members on the 11th May. On the same day, Lord Palmerston was applied to, to name an early day to receive a deputation of Members of the Society on such proposed Bye-laws. His Lordship fixed the afternoon of Friday, the 27th May, to receive the deputation. At this meeting his Lordship requested the proposed modifications to be sent to him in writing. This statement was delivered at the Home Office on the Monday morning following (the 30th May). His Lordship's provisional confirmation bears date the 17th June following. If his other pressing and more important engagements precluded him from paying earlier attention to the deputation or the application of the Council, I cannot see the justice of the accusation brought against *me*, that *I* have obstructed the business of the Society.

III. As to the charge with reference to certain articles contained in the "Annals of Pharmacy," I deny your right to demand any explanations on this head.

The Press of this country is a free Press. It maintains, and daily puts in practice, its right to criticise the acts of all private or public persons, governments, bodies corporate, or associations. No person has a right to interfere in the exercise of its legitimate prerogatives in this respect. Freedom of thought and freedom of expression are the safeguards of society. Without them, there can be no liberty, no progress, no collective action. In their absence, despotism finds its power, fraud its sphere of action, and quackery its victims. It is the duty, therefore, of every man to guard liberty of intellect as he guards his life. But as few men have leisure for reflection, and fewer still the power of giving utterance to thought, it has been agreed by common consent in this enlightened country to give privilege of speech to legislators, professional critics, and, above all, to contributors to, and editors of, the Public Press. The license thus granted, it has also been agreed, shall be exercised as an *individual right*, without detriment to *official position or relative connexions*. The speaker or the writer is presumed to utter his opinions for the correction of error, or for the establishment of truth. All persons, all doctrines, all measures, all laws, rules, and regulations, are open to his animadversions. The conclusion of the critic may be right or wrong. If right, the public may adopt it; if wrong, reject it. The freedom on either side is equal. Such is the *natural* privilege of private judgment in Great Britain; and in proportion to the freedom of its exercise has been the tolerance of the Crown, the purity of the Church, the usefulness and stability of public and private institutions, and a restraint put upon the arbitrary exercise of power by demagogues, pedants, or other upstarts "clothed with brief authority." The speaker or writer is the *sole* judge of the means or language he should use on such occasions; which, for the most part, are regulated either according to the capacity of the auditory or readers, the character and actions of the individuals criticised, but more especially the subject-matter under consideration. He has equal right to express his thoughts and opinions in such manner as he may think best calculated to draw attention; or, if such be his object, to excite discussion. But, whatever form of words may be employed, Truth will ultimately prevail.

If the Editors of the "Annals of Pharmacy" have transgressed the law, there is a proper tribunal of appeal, and a remedy is afforded; but that tribunal is not the Council of the Pharmaceutical Society of Great Britain.

I have the honour to remain,
Mr. President and Gentlemen,
Your most obedient servant,
WILLIAM DICKINSON.

16, Cambridge-street, Hyde Park,
November 2, 1853.

THE OPINION OF J. H. LLOYD, ESQ., BARRISTER-AT-LAW,

RESPECTING THE

ILLEGALITY OF THE BYE-LAWS OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

CASE AND OPINION.

CASE.

The Pharmaceutical Society was instituted in the year 1841, for the purpose of uniting the Chemists and Druggists into an ostensible and recognized body, having for its object the protection of their general interests, and the advancement of the practice of Pharmacy, by furnishing such an uniform system of education as should secure to the profession and the public the safest and most efficient administration of medicine. It consisted of Members, paying an annual subscription of £2 2*s.*; and Associates, paying £1 1*s.*; and its affairs were conducted by a Council of Members, under the provisions of a code of Bye-laws.

On the 18th of February, 1843, a Royal Charter was obtained, whereby the petitioners therein named, and the other then existing Members of the Society, with the future Members, to be approved according to the Bye-laws thereafter to be framed, were incorporated by the title of the "Pharmaceutical Society of Great Britain." Amongst other things, the Charter provided—

That the Society should consist of persons who should be called Members thereof, and that such Members should be—First, Chemists and Druggists who had been established on their own account at the date of the Charter. Secondly, Persons who should be examined in such manner as the Council of the Society should direct and be certified to be duly qualified for admission; or, thirdly, Persons who should have been elected as Superintendents by the Council. All of which Members should subscribe to the funds of the Society in such manner as should be prescribed by its regulations:

That there should be admitted to all the privileges and benefits of the Society, except the right of attending its general meetings, persons to be called Associates, to consist of Assistants to Chemists and Druggists, Apprentices and Students in Pharmacy and Chemistry, having first been examined and certified to be duly qualified—who should also subscribe to the funds of the Society in manner to be prescribed:

That the affairs of the Society should be managed by a Council:

That the Council, or such persons as they should think fit to appoint, should have power to examine and decide upon the admission or rejection of Members, and to grant diplomas to such persons as they should deem qualified to become Members of the Society;

Also, that the Council should have power to make Bye-laws for regulating the affairs of the Society, the admission and removal of Members, Associates, &c., for ascertaining the qualifications of persons to become Members, Associates, &c.; and the sums to be paid by them respectively, whether upon admission or otherwise, towards carrying on the purposes of the Society; and such Bye-laws from time to time to alter or revoke, and make new Bye-laws, so that the same should not be repugnant to the provisions of the Charter or the laws of the realm.

Up to this period it will be observed that the Society was simply a voluntary Association, and the Charter in no way affected the general body of Chemists and Druggists.

In June, 1851, the Council made and published a code of Bye-laws, hereinafter designated the Bye-laws of June, 1851.

By these Bye-laws it was provided—

Sec. i., No. 1.—That all persons desirous of becoming Members, except Associates admitted prior to the 1st July, 1842, and Chemists and Druggists established on their own account at or prior to the 18th February, 1843 (the date of the Charter), should pass an examination to be styled the "major examination."

Sec. i., No. 2.—That Associates admitted prior to the 1st July, 1842, should be eligible to be admitted as Members, on producing such certificates of qualification as should be required by the Council, in conformity with the provisions of the Charter.

Sec. i., Nos. 3 and 4.—That all Chemists and Druggists established on their own

account at or prior to the 18th February, 1843, might, on being approved by the Council, be elected Members of the Society.

Sec. i., No. 5.—That every person elected as last mentioned, should, in addition to the annual subscription of a Member, pay an entrance-fee of £2 2*s*.

Sec. i., No. 8.—That persons having passed the "major examination," on producing the certificates of qualification above referred to, and being approved by the Council, should be elected Members of the Society.

And, by Sec. ii., Nos. 1 and 2.—The annual subscriptions of Town Members are fixed at £1 11*s*. 6*d*.; Country Members at £1 1*s*. But, by these Bye-laws, no fee was fixed for payment on examination.

Under these Bye-laws, therefore, three classes of persons are declared eligible to become Members of the Society, namely, persons passing the major examination; Associates of the Society admitted prior to the 1st July, 1842, and complying with Sec. i., No. 2; and Chemists and Druggists established on their own account at or prior to the 18th February, 1843, and complying with Sec. i., Nos. 3 and 4. The last having to pass no examination, but being required to pay an entrance-fee of £2 2*s*., in addition to their annual subscriptions as Members.

In the following year the Society succeeded in obtaining an Act of Parliament, the 15th and 16th Vict., c. 56, which received the Royal assent on the 30th of June, 1852.

It is especially important, in reference to the present case, to note the purposes of this Act, as recited in the Preamble—namely, "the preventing of ignorant and incompetent persons from assuming the title, and pretending to be Pharmaceutical Chemists, or Pharmaceutists, or Members of the Pharmaceutical Society, and for giving additional powers for regulating the qualifications of the persons who might carry on the business of Pharmaceutical Chemists." The principal object and intention of the Act, in strict accordance with the professed purposes of the original Society, and afterwards of the Charter, therefore, was to make provision for the due qualification of persons who might thereafter carry on the business of Pharmaceutical Chemists, both as a protection to those Chemists and Druggists who should have duly qualified themselves to carry on a business requiring a careful, practical, and scientific education, and as to the public. And this object it was proposed to attain by requiring all persons thereafter intending to practise as Pharmaceutical Chemists to undergo the test of an examination. And, from this positive requirement, *the only exception* would appear to be in favour of existing Members of the Society at the date of the Act, so as to prevent it from having a retrospective effect.

By Section i. of the Act the Charter was confirmed, except so far as altered or repealed by the Act.

By Section ii. the Council was empowered to alter and amend the Bye-laws of the Society, made in pursuance of the Charter, and to make new or additional Bye-laws, as they should deem proper for the purposes *contemplated* by the Charter or the Act, provided that all such original Bye-laws, and all altered, amended, or additional Bye-laws should be approved by a Special General Meeting of the Members of the Society, and by one of her Majesty's principal Secretaries of State; and provided also that the then existing Bye-laws should continue in force until the then next Annual Meeting of the said Society, to be held in May, 1853.

By the ivth. Section the Council was directed to appoint a Registrar.

By Section v. the duties of the Registrar were defined to be, "from time to time to make and maintain a complete register of all persons, *being Members of the Society*, and Associates, Apprentices, and Students, according to the terms of the Charter, and all such registers and other books as might be required by the Council, and be necessary for giving effect to the Bye-laws and the provisions of this Act."

By Section vi. it is enacted, that "all such persons as shall *at the time of passing of this Act* be Members, Associates, Apprentices, or Students of the said Pharmaceutical Society of Great Britain, according to the terms of the said Charter of Incorporation, *shall be registered* as Pharmaceutical Chemists, Assistants, and Apprentices, or Students respectively."

By Section viii., the Examiners, appointed in pursuance of the Charter, or the Bye-laws thereof, or under this Act, are empowered to examine all persons who should present themselves to be examined under the provisions of the Act; and to grant or refuse them certificates of competency to exercise the business of a "Pharmaceutical Chemist."

By the xth. Section it is provided that every such person who should have been so examined as aforesaid, and have obtained a certificate of qualification, should be *entitled to be registered* by the Registrar according to the provisions of the Act, upon payment of such fee or fees as "shall be fixed by the Bye-laws;" and every person duly registered as a Pharmaceutical Chemist is declared eligible to be elected as a Member of the said Society according to the Bye-laws thereof.

By the xiith. Section it is provided that from and after the passing of this Act it should not be lawful *for any person* not being duly registered as a *Pharmaceutical Chemist* according to the provisions of the Act, to assume or use the title of a Pharmaceutical Chemist, or Pharmaceutist, in any part of Great Britain, or to assume, use, or exhibit any name, title, or sign, implying that he is registered under this Act, or that he is a Member of the Society, under a penalty of £5.

The remaining sections do not affect the points in the case.

The Act, it will be observed, first introduces or recognizes the title of "Pharmaceutical Chemist" or "Pharmaceutist," and distinctly points to two classes of persons, "Members of the Society," and "Pharmaceutical Chemists," or "Pharmaceutists," the latter being evidently designed to meet the case of such persons as should have undergone the required examination and obtained their certificate of competency to practise as Pharmaceutical Chemists, but might not be desirous of becoming Members of the Society. And it was made compulsory upon all persons, with the sole exception of Chemists and Druggists who were Members of the Society at the time of the passing of the Act, who should desire to be registered and assume the title of Pharmaceutical Chemists, to undergo an examination, and pay such fee or fees as SHOULD be fixed by the Bye-laws.

It may also be mentioned, that it was originally intended by the Act to extend the benefit of registration to all Chemists and Druggists in business at the date of the Act, and to place them on the Register of Pharmaceutical Chemists. But these provisions were struck out in committee.

Immediately on the passing of the Act the Council proceeded to canvass the Chemists and Druggists throughout the country, offering to those who had commenced business on their own account after the date of the Charter, and prior to the date of the Act, and who should make application before the 1st of May, 1853, to admit them as Members of the Society, on passing a more lenient examination than subsequent applicants, and on payment of an entrance fee for Country Members of £3 3*s*., and for Town Members of £3 13*s*. 6*d*. The fee to be imposed on applicants after the 1st of May, 1853, under the new Bye-laws which had been prepared to take effect after that date, having been fixed at £10 10*s*. The Council subsequently prepared and obtained the confirmation of a General Meeting, and of the Secretary of State on the 3rd November, 1852, of the following Bye-laws, afterwards called the Bye-laws of November, 1852.

By the first of these Bye-laws it was declared that Chemists and Druggists who had commenced business on their own account after the date of the Charter, and prior to the passing of the Act 15 and 16 Vict. cap. 56 (30th June, 1852), and who should before 1st May, 1853, apply to be admitted as Members by certificate of qualification, according to the terms of the Charter, should, on production of certificates satisfactory to the Council, be registered as "*Chemists and Druggists, certified to be duly qualified for admission as Members of the Society*," but that after the day of the Annual Meeting of the said Society in May, 1853, the register would be closed, after which time the persons so registered should be admitted as Members of the Society on payment of *the entrance fee*, and the subscription for the current year.

By the second it was declared that Associates of the Society admitted prior to the 1st day of July, 1842, should be admitted as Members of the Society on the production of certificates satisfactory to the Council.

These Bye-laws it will be observed make no reference to the "Register of Pharmaceutical Chemists," but simply offer on production of the required certificates to register as "duly qualified for admission *as Members of the Society*," Chemists and Druggists who commenced business on their own account after the date of the Charter, and prior to the passing of the Act.

In consequence of this invitation, many gentlemen who had neither been Associates of the Society prior to 1st July, 1842, nor established in business prior to the

18th February, 1843, but who had commeneed business between the latter date and the passing of the Act, have applied to be admitted as Members of the Society, and were elected, and have been placed on the "Register of Pharmaceutical Chemists," not merely on a more lenient examination, but even, in many instances, on no examination at all, on payment by Country Members of a fee of three guineas, and town Members of three guineas and a half, instead of £10 10*s*., the fee required by the Bye-laws subsequently passed in pursuance of the Act which will be presently adverted to.

The new code of Bye-laws to supersede those of 1851 and 1852, which latter would cease to be in force after the 1st of May, 1853, was submitted to and approved at a Special General Meeting of the Members, held the 11th May, 1853; and on the 17th of June following, received the provisional sanction of Lord Palmerston.

Section i. of these Bye-laws has reference to the qualification of *Members* of the Society, their admission, and the subscriptions and fees to be paid by them.

No. 2 declares that "*Chemists and Druggists* who had commenced business on their "own account *after* the date of the Charter, and prior to the passing of the Act, "and who have been registered as *Chemists and Druggists, certified to be duly* "*qualified for admission as Members*, should be admitted as Members on payment of "the *Entrance-fee* and the subscription for the current year. And that no person "whose name should not be included in the said register, unless an Associate "within the meaning of No. 3, should, after the Annual Meeting to be held in the "month of May, 1853, be admitted as a *Member* of the Society, except in the "manner provided in the tenth clause of the Act."

This Bye-law appears to be framed for the purpose of carrying into effect the Bye-laws of November, 1852.

No. 3 declares that "Associates of the Society, admitted as such prior to the 1st day "of July, 1842, should be admitted as Members of the Society on the production "of certificates satisfactory to the Council."

No. 6, "that *Pharmaceutical Chemists* registered under the 10th clause of the "Phar-"macy Act, should, on admission as Members [to the Society], pay the sum of "£5 5*s*. as a life subscription."

No. 7, "that all Members being such prior to the 1st day of July, 1853, not being "Life Members, should pay an annual subscription or registration-fee of one guinea, "or in lieu thereof the sum of ten guineas as a Life Member's subscription."

No. 12 fixes the annual subscription or registration-fee of all Members [of the Society] at one guinea, which may be commuted for a single payment of ten guineas.

The 10th section of these Bye-laws regulates the Boards of Examiners and the examinations, major and minor, and the examination-fees. And by No. 11 the fee to be paid by all candidates (not having been previously registered as Assistants) passing the major examination, to entitle them to be registered as *Pharmaceutical Chemists*, is fixed at ten guineas. Registered Assistants having previously paid a fee of five guineas, are subsequently required to pay the further fee of five guineas on passing the major examination.

Thus it will appear that all Members of the Society, having been such prior to the 1st of July, 1853, are required to pay an annual subscription of one guinea or a life subscription of ten guineas; and that Pharmaceutical Chemists, under Section x. of the Act, having paid ten guineas on registration, on admission as Members of the Society, shall pay five guineas as a life subscription.

Questions have arisen as to the power of the Council to admit these applicants either on the register of Members without complying with the requisitions of the xth. section of the Act, as also placing their names in the Register of Pharmaceutical Chemists without passing the major examination, and paying £10 10*s*., the fee prescribed by the Bye-laws of June, 1853, Section xth., No. 11.

The Bye-laws of June, 1853, having created great dissatisfaction, though carried at the General Meeting of the Members in May last, when they were submitted to Lord Palmerston for his sanction; he was waited upon by a deputation from the Council and another from the dissentient Members, and in consequence of the reasons urged by the latter, his Lordship gave the Bye-laws only the following provisional confirmation:—

"I hereby certify my confirmation and approval of the annexed Bye-laws, "confirmed and approved at a Special General Meeting of the Pharmaceutical Society of Great Britain, held on the 11th ult., for the space of one year from this

"date, and subject to the decision of a court of law upon the legal questions which "have arisen, or may arise, in reference to any of them.

(Signed) "PALMERSTON.

"*Whitehall*, 17*th June*, 1853."

It has been contended, on the part of the Council, "that, as the Special General Meeting of the Members confirmed the Bye-laws without any reference to time, &c., there is no proviso in the Act which authorized the Secretary of State to limit the operation of them for the space of one year, or make his sanction subject to the opinion of a court of law upon any legal question which may have arisen, or may arise, in reference to any of them," the confirmation of Lord Palmerston, therefore, is, in fact, an *absolute* confirmation of the Bye-laws, and may be acted upon until set aside by the Queen's Bench; while, on the other hand, it is contended that the Bye-laws remain still unconfirmed.

The Charter; the Bye-laws of June, 1851; the Act of Parliament 15 and 16 Vict., cap. 56; the Bye-laws of November, 1852; the Bye-laws of June, 1853; Case laid before Mr. Bramwell, and his opinion; and a case prepared by the Council of the Pharmaceutical Society, and Mr Tidd Pratt's opinion, are left herewith.

The Editors of the *Annals of Pharmacy*, having received numerous communications from subscribers and others, requesting information on the powers of the Council,

Counsel will please to advise—

1. Whether the Charter or Act of Parliament empowered the Society to make Bye-laws to the effect of the Bye-laws No. 1 and 2 of November, 1852.

2. Presuming such Bye-laws to be regular, whether the Council can place on the "*Register of Members*" of the Society the persons in these Bye-laws named, and who have been registered "as Chemists and Druggists certified to be duly qualified for admission as Members," without requiring such persons to pass the major examination required by the Bye-law of June, 1851, and June, 1853?

3. Whether the Council can legally place such persons on the "*Register of Pharmaceutical Chemists*" without such persons passing the major examination, and paying a fee on such examination as should be fixed by the Bye-laws in pursuance of the 10th section of the Act?

4. Whether the applicants, "who were neither Associates of the Society prior to the 1st July, 1842, nor established in business PRIOR to the 18th February, 1843, and who have been elected Members of the Society in conformity with the Bye-laws of November, 1852, and placed on the register of Pharmaceutical Chemists," are legally placed on such register?

5. If the above questions be answered in the negative, whether all such persons, before they can be legally placed on the register of Pharmaceutical Chemists, are not obliged to conform to the Bye-laws of June, 1853, and pass the major examination, and pay on such examination a fee of ten guineas, and a further fee of five guineas on being admitted as Members of the Society, or what other fee?

6. Should such registration be illegal, how is a member of the Society to proceed to obtain the removal of such name from off the "register of Pharmaceutical Chemists" or the "register of Members?"

7. Whether under the circumstances above stated it was competent to the Secretary of State to confirm the Bye-laws of June, 1853, for the limited period of one year; and if so, whether they will not, after the expiration of that term, require to be reconfirmed by a Special General Meeting of the Members and one of Her Majesty's principal Secretaries of State? or whether, in fact, the Bye-laws do not now remain unconfirmed?

OPINION.

I. I am of opinion that the Bye-laws of November, 1852, were not legally made, and have no force or validity.

The Pharmacy Act passed on the 30th of June, 1852. There is in the 2nd Section of that Act, a proviso that the existing Bye-laws of the Society—that is to say, the Bye-laws existing and in force on the 30th of June, 1852—shall continue in force until the next annual meeting of the Society, to be held in the month of May, 1853. In the face of this express enactment, I do not see how it can be contended that the Council of the Society was competent to alter or add to the existing Bye-laws in the interval between the passing of the Act, and the annual meeting of May, 1853.

But even supposing it were competent to the Council to have made new or

additional Bye-laws, or to have altered the existing Bye-laws in the interval before mentioned, it is quite clear that after the passing of the Act they could not make any Rules, Regulations, or Bye-laws, which were inconsistent with the provisions of the Act, or of the Charter, as controlled and varied by the Act. And I am of opinion that the so-called Bye-law, No. 1, of November, 1852, is *inconsistent* with the intent and provisions of the Pharmacy Act. As I read the Act, it is intended that thenceforth all persons registered as Members of the Society will be entitled to the name and privileges of Pharmaceutical Chemists; and two classes of Members are distinctly pointed out—namely, *first*, those who were already registered *at the time of the passing of the Act;* and, *second*, those who shall have passed the examination, and have obtained the certificate of qualification prescribed by the Act, who shall, moreover, have paid such fee or fees as *shall be fixed by the Bye-laws*, and shall thereupon have been duly registered as Pharmaceutical Chemists, and who being thus rendered eligible, shall have been elected Members. So that, since the passing of the Act, although a person having passed the major examination, and paid the fee prescribed by the Bye-laws, is entitled to be registered as a Pharmaceutical Chemist, but is not, of necessity, a Member of the Society, though eligible to be so. Yet any person who is a registered Member of the Society would be entitled to the name and privileges of a Pharmaceutical Chemist. Now, the effect of the Bye-law, No. 1, of November, 1852, is to qualify for admission as Members, and therefore as registered Pharmaceutical Chemists, a class of persons who were neither Members at the passing of the Act, nor persons qualified to become so under the provision of the Act, and such Bye-law, therefore, as it seems to me, was *ultra vires*, and wholly void.

II. I cannot assume the Bye-law to be regular because it impliedly excludes the necessity of such examination as contemplated by the Act. Whereas my opinion is that no person can be admitted as a Member of the Society (not being a Member at the date of the Act) who has not passed such examination.

III. I am of opinion that the Council cannot legally place on the register of Pharmaceutical Chemists any persons not having been Members of the Society at the date of the Act, as shall not have passed the examination and paid the fee prescribed in virtue of the 10th section of the Act.

IV. It follows from what has been already said, that in my opinion the persons referred to in this query have not been legally placed on the register, and are not entitled to the name or privilege of Pharmaceutical Chemists.

V. I am of opinion that such persons, before they can be lawfully registered as Pharmaceutical Chemists, must pass the major examination and pay the prescribed fee of *ten guineas;* and that, before they can become Members of the Society, they must also pay the further fee of *five guineas*.

VI. There is some difficulty in advising as to the course to be pursued for causing the removal from the register of persons unduly and illegally placed thereon. The penalty for an unlawful assumption of the title, *it seems*, would be recoverable only by plaint at the suit of the registrar; and, under the particular circumstances of the case, the remedy would seem to be ineffectual. But I am disposed to think that a *mandamus* would lie to the Council to expunge the names. If this should fail, it may be contended that, although *power* is given to the registrar to sue for the penalty, yet, this does not exclude a suit by any other person, and the experiment of such a suit may be tried. I think also that an *information* would lie at the suit of the Attorney-General, against persons assuming the title of Pharmaceutical Chemists without lawful authority. This matter, however, will require further consideration, if any proceeding should become necessary.

VII. I entertain very considerable doubt whether the qualified and limited confirmation and approval of the Bye-laws of 1853, by Lord Palmerston, is in legal effect a confirmation at all. The confirmation is given in the exercise of a power conferred by the Legislature, and must strictly follow the power. If a confirmation for a year would be good, so would a confirmation for a month or a week; and it appears to me clear that the Secretary of State has no power to attach any such limitation; *but I do not think that, therefore, the limitation must be rejected, and the confirmation be taken as absolute.* It rather appears to me that the limitation destroys the efficacy of the confirmation.

Upon the points submitted to Mr. Bramwell, I entirely concur in the opinion given by him, a copy of which is before me.

1, *King's Bench Walk, Oct.* 24, 1853. (Signed) J. H. LLOYD.

PHARMACEUTICAL MEETING,

Wednesday, November the 9th, 1853.

THE PRESIDENT IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM.

Wittstein's *Practical Pharmaceutical Chemistry*, from the Translator, Mr. Stephen Darby.

Quarterly Journal of the Chemical Society, from the Society.

Die ostindische Rohwaarens-ammlung der Friedrich-Alexanders-Universität zu Erlangen, beschrieben und erläutert von Dr. T. W. C. Martius.

Tonquin Beans, Locust Gum, Indian Wax, Fruit of the Touron Palm, and specimens of False and True Isinglass, from Mr. Stutchbury, Demerara.

Coffee grown in Caffraria, and specimens of the following grown in the Royal Botanic Gardens: Eugenia Pimenta, Quassia Amara, Colocasia odora, and Thalia dealbata, from Mr. Bentley.

Widow-wail (Cneorum tricoccon), from Mr. C. M'Culloch.

The Berzelius Medal, from Dr. Hamberg, Stockholm.

The following communications were made:

ON THE PRODUCTION OF SCAMMONY IN THE NEIGHBOURHOOD OF SMYRNA.

BY SIDNEY H. MALTASS, ESQ.

The scammony plant, called by the Greeks Σκαμμωνία, and by the Turks *Mamoutià* (by which last name it is also designated by the Greeks of Anatolia), grows wild not only in all parts of Anatolia, but also in Syria and in some of the Greek and Turkish islands of the Archipelago. It affects mountainous districts, but is also found in the plains and in open ground, flourishing most luxuriantly among the Juniper, Arbutus, and wild Valonea bushes, which afford both shelter and support for its branches, and whose decayed leaves form a light soil favourable to its growth. The root is succulent and shaped like a carrot: when about four years old, it is generally one or two inches in diameter at the crown, whence it tapers gradually to the extremity with occasional fibres, its length varying from ten inches to two or even three feet, according to the depth of soil. Sometimes it attains a larger size, and in a few instances has been found of four or even five inches diameter at the crown. The colour of the flower is usually of a pale yellow, or white with red external stripes. The root is the same whatever the colour of the flower may be and there is no perceptible difference in the leaf. There is no distinguishing peculiarity in the scammony produced from plants bearing different coloured flowers, the roots of which are cut by the peasants indiscriminately, although the yellow-flowered plant is the more abundant. The only perceptible difference in quality is occasioned by the soil. The scammony which has the strongest odour is that produced in mountainous districts and on a poor soil; rich soils and marshy ground produce a scammony-juice containing a larger proportion of water, which when dry forms a scammony of a greyish-black and of less specific gravity.

The districts in which scammony is collected are widely extended. The peasants of Smyrna and of the neighbouring villages extend their peregrinations to Adalia on the south, and Brussa or Mount Olympus on the north, and some have been as far as Angora. Sochia or the district of the river Mœander produces a large quantity, but Kirkagatch and Demirgik, in the plain of Mysia, furnish the largest quantity of all. But little comes from Konieh or Kutaya. The only inferior *pure* scammony that I know, is produced at Melissa or Melas.

I am not aware of any scammony being produced in Samos, nor do the peasants of that island know of any plants existing there, though it is probable that a few may be found. Some of the Samians collect the drug, but they cross over to

the mainland and work in the neighbourhood of Sochia on the Mœander, Scala Nuova, and Ephesus. They usually carry it for sale to Smyrna, but occasionally sell it in Samos. That which Tournefort saw must have been highly adulterated with flour or starch.*

During the summer months the scammony is collected by the Greek and Turkish peasants while the plant is in flower. They commence operations by clearing away the bushes which shelter the plants; the soil is removed from the root to the depth of three or four inches, the root is then cut through in a slanting direction with a sickle-shaped knife, about one inch to one inch and a half below the crown; a muscle shell is immediately stuck into the root under the lower part, and the sap or milk runs into it. A stone is then placed to windward of the root to protect the shell from the loose earth and dust, which might otherwise be blown into it by the high winds prevalent in summer. The sap flows freely early in the morning and late in the evening, but ceases during the hottest part of the day. One plant will not generally fill a shell, but it does sometimes happen that a good root will fill two or three; in such latter case the peasant removes the first as soon as it is full and places another, and so on until he perceives that the root is nearly drained. The quantity afforded by one root varies according to soil, position and age. In some districts one hundred roots produce but ten drams of scammony, in others the average of each root is one dram, and in a good soil a four-year plant will produce two drams. I have heard of one root four inches in diameter producing twelve drams of scammony, but those which I have cut, did not produce over one dram, and some afforded none at all. The shells are usually left till the evening, when they are collected and the cut part of the root is scraped with a knife to remove the dry or partially dry drops of scammony which form after the first part has run off. These drops are called by the peasants *Kaimak* or cream, while the sap which flows into the shell is termed *γάλα* or milk. The peasants then empty the shells (from which they carefully blow the dust) into copper vessels and work up the drops scraped from the roots together with the contents of the shells. This is done with a knife, and continued until the whole is so well mixed that it forms a string when run off the knife. If it be too dry, then water is added, but in that case it must be done during the hottest part of the day, when Fahrenheit's thermometer stands at from 86° to 90° in the shade, otherwise it will not amalgamate properly. This is the *pure Lachryma Scammony*. That which the Greeks collect is far better than that collected by the Turks; the latter, with their usual apathy, do not trouble themselves to screen the shells from the dust, nor do they blow off any of that which may have accumulated upon the hardened surface of the scammony in the shell. They show equal carelessness by scraping the roots too hard to remove the drops, and frequently allow small pieces of the root to fall into the receiving vessels.

Scammony is never sold in shells. When dry it would be difficult to empty them: the peasants, however, frequently keep a few for their own use, as this drug is much employed by them for the purpose of staunching blood and healing wounds. They also use it as a purgative, the usual dose being one dram in a glass of warm water.†

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* *Note by Mr. Daniel Hanbury.*—This is in reply to an inquiry addressed to the author respecting the scammony of Samos. It appears to me, however, that very undue stress has been laid upon the brief remark of Tournefort regarding this supposed variety of scammony. Tournefort says, "*nous ne vîmes pas la plante d'où elle se tire.*" (*Relation d'un Voyage du Levant*, Paris, 1717, tome i., p. 411.)

Further, it seems certain from information communicated to me by Mr. Maltass, that scammony is collected solely from *Convolvulus Scammonia*, Linn., in fact, precisely as Sherard stated to be the case, see Geoffroy, *Tractatus de Materiâ Medicâ*, Paris, 1741, tome ii., p. 667.—*D. H.*

† One dram of scammony will doubtless appear a large dose, but it is nevertheless a fact that the *contents of a shell*, the average of which is a dram, is the usual quantity given.

One of the Greek peasants, while collecting scammony last year near Macri, opposite the island

The scammony brought to market by the Greek peasants is almost the only pure sort that can be obtained. It does not exceed 300 *okes* yearly, or about seven hundred weight, and is sold at a high price to a few dealers who know its superiority.

When purchased it is placed in a room having the windows open to allow the wind to blow over it, care being taken to prevent the rays of the sun from striking upon it. Here it is spread upon sheep-skins, flattened if moist and turned occasionally to prevent it becoming mouldy underneath. When nearly dry it is broken up into irregular pieces and allowed to remain a few days longer until quite dry; it is then shipped in small cases containing about thirty pounds each.

Pure scammony is easily recognised when dry; it is light in weight and breaks easily with a glossy fracture. If no water have been added by the peasants, the colour of the fracture is reddish-black. If water have been added, or the scammony have been collected in shady places, the fracture is black and very glossy.* If it have been put in tins or skins, the fracture is black and not so glossy. And if the dry drops or *kaimak* scraped from the roots be not worked up with the γάλα or milk, pieces will be found of a light red colour resembling rosin. An emulsion is immediately produced by application of the tongue, excepting when water has been added without the assistance of the sun's rays, in which case the emulsive property becomes impaired.

One of the best characters of genuine scammony is its golden reddish colour when reduced to small fragments. *Black* scammony is indeed to be met with, but it is uncommon (unless it be adulterated), nor do I consider it perfectly pure.

The scammony which is next best to that collected by the Greek peasants of Smyrna, is that collected by the Turkish peasants. It is black in colour, heavier, and does not break so readily; this is occasioned by pieces of the root being scraped off whilst removing the hard drops which adhere to it. The Turks prefer sedentary work to any which requires activity, and as they know that a portion of scammony is left in the roots that they have already cut, they content themselves with pulling up these, rather than perambulate the country in search of fresh. These roots, they pound with stones and then boil them;† after removing from the decoction the larger pieces, the remainder of it is thrown upon the scammony and worked up with it. This occasions the quantity of fibre or vegetable substance which is found in some samples of scammony.

Most of the peasants adulterate the scammony before bringing it to market. One process is as follows: after the scammony is mixed with water, a certain quantity of white chalky earth is added. The earth is first sifted through a silk handkerchief, so as to make it fine enough to prevent detection by the touch, while the scammony is in a liquid state; the peasant adds earth according to his fancy, from 10 to 150 per cent. The colour of soft, moist scammony is not affected by the addition of earth, unless the quantity exceeds 20 per cent.; when dry, it is apparent to any one acquainted with the drug.

The Turkish peasants sell their scammony in the different towns in the interior of Anatolia. Being poor, they cannot afford copper vessels such as are used by the Greeks; they consequently use pumpkins hollowed out, skins and earthen pots. The Jews and Greeks are the principal buyers of this scammony, but as they are not well acquainted with the drug, they do not separate the good from

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of Rhodes, had an application made him by a Turk for a dose of scammony. He gave him a shell full. The Turk, thinking that if the contents of *one* shell would prove salutary, that of a *greater number* would be productive of proportionately greater good, stole three or four more from the Greek, took the whole, and died the same day from the effects.

* In another communication the author remarks, that the addition of water or a decoction of the scammony-plant, causes a change in the colour of the drug; when dry, it becomes of a glossy black, whereas, *in the natural state, it is of the colour of rosin, and semi-transparent.*—Ed. Ph. J.

† Sometimes a decoction of the leaves and stalks is also used.

the bad, but throw it promiscuously, while still fresh, into cotton bags. These bags are then put into drums and sent into Smyrna for sale. There this scammony frequently remains for some time and becomes partially mouldy; when purchased, it is turned out, but being half dry it cannot be made into flat cakes like the pure Greek scammony: it is therefore broken into irregular pieces or rough lumps, and allowed to dry in that state. Its long confinement causes it to ferment, and this makes it porous and lose its gloss. It is this kind which is usually sold in London as *Lachryma Scammony*, and although excellent pieces may be picked out of it, the bulk is greatly inferior to that collected by the Greeks. The best lots of this sort may contain seventy-six per cent. of resin.

There is also a considerable quantity of scammony sold in London in rough lumps, which is very inferior, and yet is sometimes lighter in weight than the purer sort. This scammony is prepared by the dealers in the interior of the country. When starch has been added, it continues light in weight but becomes tenacious. The usual mixture is wheat-starch,* wood ashes, earth (not always calcareous), and gum arabic, or gum tragacanth—occasionally wax, yolk of egg, pounded scammony roots and leaves, flour, or resin are added. These mixtures vary so much that it is almost impossible to find two parcels exactly alike. This adulterated scammony is put into drums, and scammony nearly pure and about as liquid as honey is put on the top to give it a good appearance and to prevent detection, which, without this precaution, would not be difficult, the surface of the adulterated drug being always dry.

There is also a quality of scammony prepared at Angora and sent to Constantinople for sale. It is composed of from thirty to forty per cent. of scammony with sixty to seventy of starch, and is called *Skilip*.† This quality is much used in Austria, where cheap drugs are required without much reference to efficacy.

There are also two kinds of scammony used largely in England and Scotland. The better kind termed *First quality prepared*, is made up into thick smooth cakes or loaves, and shipped in cases or drums. When packed the cakes are sometimes broken up. This kind is prepared principally by the Jews and in Smyrna only; the following is the process:—A quantity of scammony of inferior kind containing earth, woody substances and occasionally gum, as brought from the interior, is mixed with about forty per cent. of *skilip* or inferior Angora scammony, such as has been already described. This having been effected by pounding, warm water is added and the mixture placed in a shallow iron dish beneath which another of the same shape, but of larger proportions, and half filled with water, is set over a charcoal fire to act as a water-bath. When the scammony is thoroughly melted and one kind has amalgamated with the other, which usually requires about half an hour, the contents of the dish are removed on to a sheepskin and rolled with the hands till cold. It is then made into flat or oval cakes or loaves with rounded tops, which are next washed over with a solution of pure scammony to give them a gloss, and, lastly, placed in a room with open windows to dry. This scammony usually contains about fifty per cent. of pure resin.

The other kind is called *Second quality prepared*, and is made in a similar manner. It is composed of about sixty per cent. of inferior Angora scammony or *skilip*, thirty per cent. of a better kind from the neighbourhood of Smyrna, to which are added about ten per cent. of gum arabic and black-lead. This scammony contains about thirty per cent. of resin, fifty per cent. of starch and

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* The scammony collected near Smyrna is rarely adulterated with starch by the peasants.

† *Skilip* or *Iskilip* is a Turkish word and used to designate a fictitious substance. For instance, a species of yellow berry which is small and contains little or no dye, is termed *skilip*. Spurious gum tragacanth and inferior Angora scammony are known under the same name, but I am not aware of any other drug or produce of any kind to which this term is applied. The origin of the word, however, is derived from a Turkish town near Angora called Iskilip.

white earth, and the remainder woody substances, gum, &c. Other proportions are occasionally used.

The small quantity of scammony that can be obtained pure has induced me to resort to the use of alcohol for extracting the resin from some of the inferior qualities of the drug. The process is not adopted in any other part of Turkey, nor by any one at Smyrna than myself. It is as follows:

A bottle half-full of impure scammony is filled up with distilled spirit of wine and allowed to remain for several days until the liquid assumes the appearance of brown sherry; it has then taken up as much scammony as it can hold in solution. This is poured off into another vessel and fresh spirit added to the residue, on which it is allowed to stand two days and then strained through a cloth. These spirituous solutions having been allowed to stand until they have deposited any impurity held in suspension, are mixed, and then decanted into cold water, when the resin of scammony is precipitated. It is washed in fresh water and then exposed to the sun or placed over a fire to evaporate. This is done to remove the spirit remaining in the scammony, otherwise it would take some months to dry.

The quantity of scammony annually sold in Smyrna amounts to about 3000 Turkish *okes*, or 7500 pounds weight. Out of this quantity about seven cwt. of pure can be obtained, the remainder being of different qualities, the quantity of resin that they contain varying from 1oz. to 15ozs. in every pound. If the whole crop were brought to market *unadulterated*, it is doubtful if the quantity would exceed 3000 pounds weight.

NOTES UPON SOME SPECIMENS OF SCAMMONY.

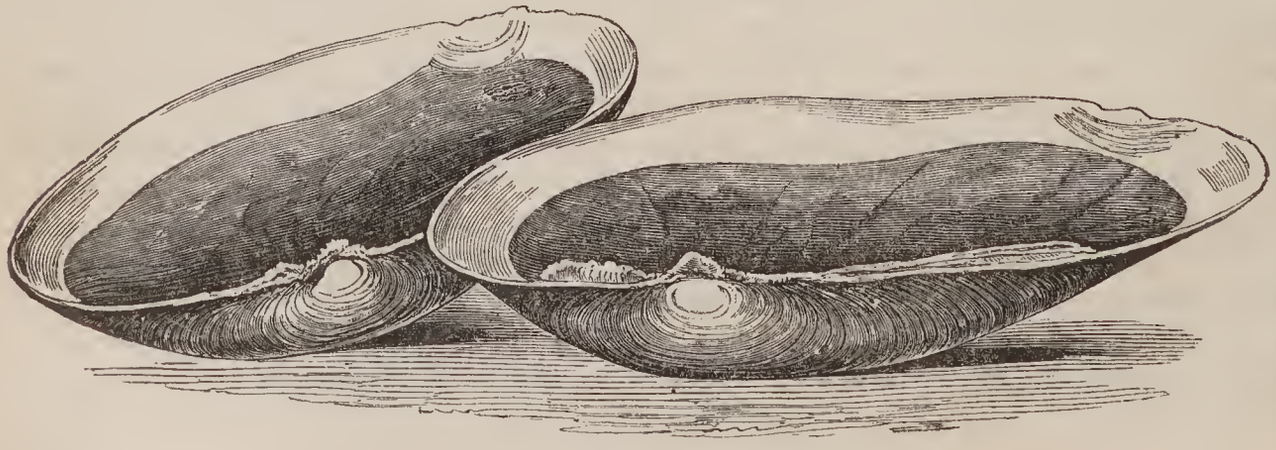
BY DANIEL HANBURY.

Having through the kindness of Sidney H. Maltass, Esq., of Smyrna, received several specimens illustrating the foregoing interesting paper on the production of Scammony, I believe that a short account of them will be not unacceptable to the readers of the *Pharmaceutical Journal.*

I will premise it by stating that Mr. Maltass has resided at Smyrna for the last eighteen years, where, as a matter of business he has had constant opportunity for becoming conversant with all that relates to the drug as met with at that place: indeed, as he informs me, he has actually collected it with his own hands in order to become the more practically acquainted with it.

To Mr. Maltass I am indebted for specimens of the following, viz.:—

1. *Pure Scammony in shells*, collected near Smyrna.



Smyrna Scammony in Shells.

It is remarkably transparent even when viewed in the shell; its colour is a pale golden brown, scarcely as intense as that of common glue, of which its general appearance is suggestive. A white emulsion is produced on rubbing the surface with a wetted finger.

This scammony affords 91.1 per cent. of resin soluble in ether.*

2. *Pure Scammony from the neighbourhood of Smyrna:* a portion apparently of a cake about an inch in thickness; colour in the mass deep brown, in small fragments pale golden brown, translucent; although compact, readily broken, fracture glossy, showing not very numerous air-cavities; odour cheesy. A white emulsion is produced immediately it is rubbed with the moistened finger; no traces, either external or internal, of any calcareous contamination. It affords 88.2 per cent. of resin soluble in ether.

An experienced judge of scammony assures me that he has never observed any of this quality in the London market.

3. *Pure Scammony from the neighbourhood of Angora* in a somewhat irregular mass, probably part of a cake about 1½ inches thick. It is very pale in colour, small fragments appearing of a yellowish brown and translucent. It is distinguishable from No. 2 by being much cracked, a quality which imparts to it a pale colour when in mass, and renders it extremely friable. The fractured surface is shining, readily affording a white emulsion when rubbed with the moistened finger.

This is a very pure scammony, containing 89.4 per cent. of resin soluble in ether. The matter insoluble in ether is nearly colourless, which is also the case with that of Nos. 1 and 2. That from No. 1 appeared under the microscope chiefly as an amorphous, gelatinous substance, soluble in water, and in which no starch-granules were observed.

4. *Pure Black Scammony* as collected in shady places. My sample appears to have formed part of a cake upwards of an inch thick. It is remarkably opaque and black even in small fragments; very thin splinters, however, show it of a greyish hue. It is compact yet very brittle; its fracture glossy; it possesses the usual scammony-odour, and affords a dingy emulsion when wetted and rubbed. My experiments prove it to contain 87.9 per cent. of resin soluble in ether.

This scammony bears some resemblance externally to Solazzi extract of liquorice. It is unknown in English trade.

5. *Smyrna Scammony "adulterated,"* says Mr. Maltass, "with magnesian earth† and vegetable matter to the extent of 20 or 30 per cent.; such is sold in London as *Lachryma scammony.*"

This scammony is blackish, rather brittle and opaque, either compact or frothy: fracture not bright, readily affording an emulsion. Treated with ether, I obtained from it 79.3 per cent. of matter soluble in that menstruum.

6. *Angora Scammony adulterated* with calcareous earth and starch to the extent of 65 to 68 per cent. This scammony is heavy and greyish with a dull clayey fracture. It is evidently very impure, affording only 33.4 per cent. of matter soluble in ether.

7. *Imitation Scammony,* "prepared," says Mr. Maltass, "from the refuse of scammony gathered by the Turkish peasants after the extraction of the resin, with the addition of gum arabic and rosin."

This substance is in hard, opaque, black, irregular cinder-like masses. I have obtained from it 44.28 per cent. of resin soluble in ether. It is needless to comment on the activity of such a compound, yet I am assured that even this would fetch 10*s.* per pound in the London market.

8. *Pure Resin of Scammony,* extracted from Smyrna scammony of 1846. Viewed in the mass it is blackish, in small fragments transparent and greenish-brown: very brittle, outer surface and fractured surface brilliant. A very scanty emulsion is produced when the surface is moistened and rubbed.

9. *Resin of Scammony,* rather less pure than No. 8.

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* In examining the solubility of scammony in ether, it is needful to dry the scammony until it ceases to lose weight, a precaution which must of course be observed in weighing the residue also.

† Or rather carbonate of lime.

10. *Pure Resin of Angora Scammony:* transparent and of a golden-brown even in the mass. Like the natural Angora scammony, it is cracked in all directions and extremely friable. When moistened and rubbed no emulsion is perceptible.

In conclusion I may remark that the striking characters of pure *natural* scammony, I mean the *unmixed* inspissated juice, are its *pale, yellowish-brown hue, its transparency, its great brittleness, its property of readily affording a white emulsion when rubbed with water*, and *the scanty amount of a white residue which it leaves upon being treated with ether.* All these characters are well shown in samples 1, 2, and 3.

The opaque *Black Scammony* No. 4, although marked *pure* is regarded by Mr. Maltass as questionable. It is certainly a very curious variety, which, if an entirely natural product, would form an exception to the above remarks.

Scammony-*resin* is distinguishable from scammony by affording hardly any emulsion when wetted and rubbed.

ON THE SOURCE OF THE "FALSE ISINGLASS FROM PARA,"

described and figured in the Pharmaceutical Journal, vol. xii., page 343.

BY MR. J. S. STUTCHBURY, OF DEMERARA.

(From a Letter addressed to Mr. Redwood.)

"In the January number of the *Pharmaceutical Journal*, I observed an article on 'A False Isinglass from Para,' with an engraving of the substance, and noticing the remark made in that article to the effect that it was probably the ovary of a large fish, it occurred to me that the so-called 'isinglass' was the dried ovary of a fish which is taken in the estuaries of the rivers of this colony. This fish is commonly called Gilbricker. It is the *Silurus Parkerii* of Trail. You will find it noticed in the *Naturalist's Library*, vol. v., part 2, where it is much better described than figured. I send you a case containing a specimen of the fish (young) and the ovaries of two full-grown fish, as well as the dried air-bladder of one of them. One of the ovaries has been inverted and dried; the other, also inverted, is preserved in spirit. The air-bladder was taken from the same fish as the ovary which is in spirit. The fish was about three feet long, and weighed about twenty pounds; it is very abundant here, and is much esteemed by many people. The dried ovary appears to me to be identical with the 'false isinglass' described in the Journal, and if you think so, and consider the specimens worthy of a place in the museum of the Society, I should be obliged by your presenting them."

NOTE ON THE FOREGOING,

BY MR. REDWOOD.

The specimen of the fish sent by Mr. Stutchbury was entirely destroyed before reaching this country. The other specimens were received, and are deposited in the museum of the Pharmaceutical Society.

The dried ovary so closely resembles the "false isinglass from Para," imported about twelve months ago, and described in the *Pharmaceutical Journal*, vol. xii., page 343, that the two substances must have been derived from the same, or from very similar fishes.

The dried air-bladder, sent by Mr. Stutchbury, is precisely similar to some of the Brazilian isinglass imported from Para; and it is therefore probable that the Silurus Parkerii is one of the sources of Brazilian isinglass as well as of the so-called "False isinglass from Para." It had already been suggested by Mr. Yarrell, although not proved, that some of the Brazilian isinglass was obtained from a Silurus, and the information furnished by Mr. Stutchbury will serve to strengthen this opinion.

The following is the description of the Silurus Parkerii, given by Schomburgh, in his *Natural History of the Fishes of Guiana*, which forms part of the *Naturalist's Library*, edited by Sir William Jardine, Bart. 1843 :—

SILURUS PARKERII, TRAIL.—PARKER'S SILURUS.

Trans. Wern. Soc., vol. vi., p. 280.

This species will range among the *Bagri* or *Pimelodi;* at the same time, we have kept the generic name which Dr. Trail applied. His description is as follows :—" It would appear to be a common species in the muddy waters of the rivers of Guiana, where they mingle with the sea; and it is found at a considerable distance from the coast. When taken it is used as an article of food. When received, the specimen measured, in length, three feet four inches; at the circumference of the first dorsal fin, one foot eleven inches; and it weighed twenty-seven pounds.

" The true Dutch name is undoubtedly *Geelbrick* or *yellow-belly.* The upper parts are of a fine olive-green ; the sides and belly of a rich yellow. The body is thickest at the first dorsal fin, and its section there would be nearly circular. It tapers quickly, yet equally, towards the tail, where it is slender; the head is broad, flat, and compressed. The vertex is defended by a rough bony plate of considerable firmness, which sends off two posterior appendices towards the upper part of the branchial apertures; the middle of its posterior margin is notched to receive the apex of a very strong heart-shaped bone, the lobes of which reach the base of the dorsal fin. This shield or plate is rough, with bony granulations, of a larger size than those of the armour of the head, and is obtusely carinated towards its posterior part.

" The head is very broad; the mouth is wide, terminal, and furnished with numerous minute teeth, which are rather intended for holding fast than biting the prey of the animal. These teeth are thickly placed on the edges of the mouth in such a manner as to resemble the hairs of a very stiff brush. They are arranged in two groups about half an inch wide, on each jaw, reaching along the whole aperture of the mouth, and are divided in front by a single furrow. Two convex, oblong bones, of considerable size, and furnished with similar teeth, form the osseous palate of the fish. The eyes are small, placed rather above the line of the mouth, and more than an inch and a half from its angles. There are six tentacula or cirrhi on the lips. The longest pair are on the upper jaw, very near the angles of the mouth, and measure full eight inches in length. The next pair are more than an inch below the lower jaw-bone, and measure four inches and a half. The shorter pair are placed near the middle of the lower jaw, and measure two inches and a half.

" The first ray of pectoral and first dorsal fins, consist of a strong and slightly incurvated bony spine, with a rough granular surface and a serrated concave edge; the sharp apices of these spines form powerful weapons of offence and defence for the naked body of the fish. The pectoral spine is a little more curved than that of the dorsal fin; all of these spines are movable, apparently, by means of strong muscles. The length of the dorsal spine is six inches and a half, that of the pectoral spines nearly six inches. Besides its bony spine, there are seven rays in the first dorsal fin; but there are no rays in the second, which is adipose, but not very thick. The number of rays in each pectoral fin, exclusive of the spine, is eleven. The two ventral fins are three inches apart, and each of them seems to have six rays. The ventral and anal fins have a deep red colour in the recent fish; the latter has eighteen rays. The tail is deeply forked, and has thirty rays. The lateral line is slightly waved; the air-bladder lies below the heart-shaped bony shield, and is attached to the first vertebra." It was named by Dr. Trail in honour of Charles S. Parker, Esq., of Liverpool.

The attention of the meeting was directed to

LEWIS'S PATENT PILL-MACHINE,

exhibited by Messrs. Hingston, Huish, and Co., of No. 1A, Old Bond Street.

The machine consists of two metal cylinders or rollers, having cut on their surface a series of hemispherical indentations, or cups corresponding in shape and size to half a pill, so that when the rollers are brought into contact, side by side and a rotary motion given them, the hemispheres in each fall opposite each other, forming a series of spherical moulds, in which, in working, the pills are cast. The arrangement for working the rollers consists of two uprights, in and between which they are fixed side by side so as to revolve on their axles. Motion is communicated by means of a handle attached to a small pinion, fitting a cog-wheel at the side of one of the rollers, at the other side of which is another cog-wheel fitting a corresponding one on the other roller; these being accurately adjusted cause each roller to revolve with equal speed so as always to bring the hemispheres opposite each other. The pill mass is introduced (by means of a small hopper) between the two rollers while in motion, and as from their being in close contact it cannot pass through, it is pressed into the hemispheres, and the pills are thus formed, which are collected from the outer sides of the rollers as they continue to revolve. Thus far the simple plan of making or casting pills by means of a rotatory machine, with minor modifications has been before attempted, but as frequently abandoned from the pills remaining firmly imbedded in the hemispheres of one or other of the rollers, and the want of a contrivance to deliver them freely without the necessity for detaching them with the hand. That difficulty in the present machine is entirely overcome, and this achievement is what constitutes its principal claim to originality and practical utility. The arrangement by which this long-sought desideratum is accomplished consists of a movable bolt or pin at the bottom of each hemisphere, which, acted upon by springs in the interior of the rollers, forces out the pills and detaches them effectually from the mould in which they have been cast. The only point of adhesion is now the end of the pin, from which they generally fall by their own gravity; but to prevent the possibility of their being drawn back again into the hemispheres by the return of the pins to their original position, they are gently lifted off by being carried between the teeth of a sort of rake pressing against the outside of the rollers. Some of the pills thus formed have a slight rim round them giving them the appearance of a seed or berry, but in every other respect they are perfect; they may therefore be left in their original state, or subjected to the usual operation of mulling. From this machine, which had only two bands or tiers of hemispheres round the rollers, about 150 pills might be turned out in a minute, or 9000 in an hour, working it very slowly. There would be no difficulty in doubling the speed of working, and the rapidity of making might be multiplied by increasing the number of moulds or hemispheres on the rollers.

GELATINE CAPSULES.

Some very well made capsules, manufactured by Mr. B. Lindman, Chemist, of Stockholm, were exhibited to the meeting. The following is a description of the different sorts of capsules made by Mr. Lindman:—

	EACH CONTAINING
Capsulæ Balsami copaivæ	Balsami copaibæ, gr. x.
" *Chinini sulphurici*	Chinini sulphurici, gr. j.; cum Olei amygd., gr. x.
" " "	Chinini sulphurici, gr. ij.; cum Olei amygd., gr. x.
" *Extracti cubebæ ætherei*	Ext. cubeb. æth. gr. x.
" " *et Bals. copaibæ.*	" " gr. ij.; cum Bals. copaib., gr. viij.
" " "	Ext. cubeb. æth., gr. v.; cum Bals. copaib., gr. v.

	EACH CONTAINING
Capsulæ Cubebæ ferratæ Hambergii	Ext. cubeb. æth., gr. v.; Bals. copaib., gr. v.; Ferri sulphatis cryst., gr. 1¼.
" *Extracti cinæ ætherei*	Ext. sem. cinæ levant. æth., gr. v.
" " "	" " " gr. x.
" " *filicis ætherei*	Ext. filicis (*Aspidii filic. mar.*) æth. gr. x.
" *Myrrhæ ferratæ*	Ext. myrrhæ gr. j.; Ferri alcoholisati, gr. ij.; Bals. copaibæ, gr. viij.
" *Assafœtidæ*	Gum assafœtidæ pulv. gr. v.; cum Ol. amygd., gr. v.
" *Olei contra tæniam Chaberti*	Oleum Chaberti, gr. x.
" " *jecoris aselli flav. l. fusc*.....	Olei jec. aselli flav. l. fusci, gr. x.
" " " *albi*	" " alb., gr. x.
" " *ligni fossilis*.....	Olei empyreumatici e ligno fossili, gr. x.
" " *ricini*	Olei ricini, gr. x.
" " " *et crotonis*	Olei crotonis (in spiritu vini solubilis), gr. $\frac{1}{10}$; Ol. ricini, gr. x.
" " " "	Olei crotonis (in spiritu vini solubilis), gr. $\frac{1}{6}$; Ol. ricini, gr. x.
" " *terebinthinæ*.....	Ætherolei terebinthinæ Gallicæ rectificati, gr. x.
" *Picis liquidæ*	Picis liquidæ Suecic., gr. x.

PHYTOLOGICAL CLUB.

November 7th, 1853.

ROBERT BENTLEY, A.H.C., F.L.S., &c., PRESIDENT, IN THE CHAIR.

The Curator reported the following Donations to the Herbarium since the last Meeting, viz.: Parcels of British Plants from Messrs. Deane, Muskett, and Reynolds (London); A. W. Bennett (Brockham); Payne (Bridgewater); Penney (Levanage); O. Corder (North Shields); Morgan (Llandilo); Baxter, Moss, Walker, Tovey, Houlton, Medley, and Gissing (Worcester).

Mr. J. Baxter of Worcester sent an account of his discovery in August last of *Anacharis Alsinestrum* in the valley of the Severn. The station was an old clay pit, in the parish of Grimley, three miles from Worcester, but not having connexion with the river, although near it. The plant had been observed by the Rev. A. Bloxam in the spring of the present year in the Severn at Shrewsbury, sixty to seventy miles higher up than Worcester. Since that the country has been subjected to very heavy floods. Fifty dried specimens of the plant were included in the contribution of the Worcester Branch to the Herbarium.

R. T. Bywater, Esq., M.R.C.S., &c., of Coniston, communicated a note upon the popular use of *Osmunda regalis*. In Westmoreland, and also the adjoining division of Lancashire, known as Lancashire north of the Sands, the rhizomes of *Osmunda regalis* are in high popular esteem as a remedial agent. The plant is vulgarly known under the name of "bog onion." It is used in the following way as an external application for bruises, sprains, &c. The rhizomes are beaten, and being covered with "cold spring water," allowed to macerate all night; the resulting thick starch fluid is then used to bathe the affected parts.

Mr. Reynolds, in presenting specimens of *impatiens noli me tangere*, from its well known station at Ambleside, took occasion to allude to the doubts which have been thrown upon its claim to be considered native, both there and in other localities. Botanists who have given an opinion upon the Ambleside station for the plant, have usually done so in an uncertain manner, and probably have considered that the peculiar property of its seed-vessels required the exercise of such caution in the absence of direct evidence proving its indigenous character. Such evidence, however, exists in the fact that the locality is recorded by Ray upwards of 160 years back. In his Synopsis (1690) it is thus mentioned;—the synonymes are given, and afterwards it is said,—"We observed it on the banks of Winandermere, near Ambleside; by the cloth-mill in Saterthwait parish, Lancashire; and in many places of Westmoreland, Mr. Lawson."—P. 209. This proves that the plant was at that period thoroughly established in the district. That other early English botanists were familiar with it is shown by its mention in the Herbals of Gerarde and Parkinson.

The next meeting will be held on Monday evening, Dec. 5, at a quarter before nine o'clock.

PROVINCIAL TRANSACTIONS.

MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

At a meeting of this Society, held in the Athenæum, Nov. 4th, 1853,

MR. STANDRING IN THE CHAIR,

It was moved by Mr. Woolley, seconded by Mr. John Wylde,

"That some educational arrangements for the benefit of the young men being desirable, Professor Calvert, Mr. Roberton, and Mr. Ransome, be requested to draw up a Syllabus for a course of Lectures on Chemistry, to be delivered during the present winter."

The following circular has been issued for the purpose of carrying out the above object:—

"*Manchester*, 111, *Oxford Street*, *November* 21*st*, 1853.

"Sir,—I beg to inform you, that in consequence of the increasing necessity for an improved Pharmaceutical Education, arising from the recent enactment of the Pharmacy Bill, arrangements have been made in connexion with the "Manchester Chemists' Conversational Society," for the delivery of a course of Lectures on Chemistry and Natural Philosophy, especially intended for the benefit of Assistants and Apprentices.

"A few gentlemen connected with the Society, including Professor Crace Calvert (who has kindly offered the use of his Laboratory for the purpose), have consented to deliver these Lectures.

"You are respectfully requested to bring the subject under the notice of the young men in your establishment, and, if possible, afford them the opportunity of attendance.

"I am, Sir, your obedient Servant,

"James Roberton, *Hon. Sec.*

"*P.S.*—Young men desirous of availing themselves of these Lectures, must send their application to the Secretary, when they will be registered as Associates of the Society, and a ticket of admission to the course given, on the payment of a subscription of five shillings."

THE BIRMINGHAM AND MIDLAND INSTITUTE.

The Birmingham Philosophical Society, in whose rooms the meetings of the Pharmaceutical Association have hitherto been held, has lately been dissolved, and out of its ashes, a new Institution on a more extended scale is about to arise, under the title of the "Birmingham and Midland Institute."

A large and influential Meeting was held at the Town Hall, Birmingham, on the 17th of November, for the purpose of inaugurating the new Association. Capt. Tindal took the chair, and was supported by Sir R. Peel, M.P.; W. Scholefield, M.P.; Sir E. Scott; The Hon. and Rev. G. M. Yorke; Archdeacon Sandford; the Rev. Chancellor Law; Mr. S. H. Blackwell; Rev. E. H. Gifford; the Rev. Sidney Gedge; Mr. Martineau; Mr. G. Dixon; Mr. A. Ryland; Mr. G. Wallis; Mr. Preston; Mr. Cole; Col. Reid, and other distinguished promoters of education. The audience comprised above 5000 inhabitants of Birmingham and its vicinity. This Institution contemplates the general advancement of education and science, the establishment of a library, reading-rooms, lecture-theatres, with philosophical apparatus and other appliances for the extension of useful knowledge. It is proposed to erect a building on a piece of ground granted for that purpose by the Corporation. The future meetings of the Birmingham Pharmaceutical Association will be held at the Institute, and the courses of lectures which are in contemplation will be available for Pharmaceutical students.

BIRMINGHAM PHARMACEUTICAL INSTITUTION.

The Annual Meeting of the Members of the above Institution was held on Friday evening, November 18th, in the late Philosophical Society's Rooms, Cannon Street. Mr. Alfred Bird, President, took the chair. Amongst the gentlemen present, were—Dr. Heslop, Dr. Nelson, Messrs. T. W. Williams, E. Snape; Jacob Bell; W. Southall, sen.; Leay, Parker, Hollier, and Buck, of Dudley; W. Southall, jun.,

Harvey, Sumner, and Canning. In front of the chair were arranged many objects of interest, among which were a very complete collection of specimens illustrating the manufacture of carbonate of soda, kindly contributed by Messrs. Chance Brothers, of Oldbury. Specimens of crystalline and amorphous phosphorus from Messrs. J. and E. Sturge, and a beautiful set of stereoscope pictures from Mr. Johnston, of New Street.

The CHAIRMAN having briefly opened the business, Mr. SCOTT, one of the Secretaries, read the Report, from which the following are extracts:—

"Twelve months having now elapsed since the last Annual Meeting of the Birmingham Pharmaceutical Institution, it becomes the duty of the Committee to lay before the Members a Report of the Transactions of the Society during their term of office. The number of subscribers has not been materially increased, and consequently the finances have not been greatly enlarged. The Committee, however, trust that, in comparison with the proceedings of former years, the operations of the Society will not be found to have diminished in usefulness or extent. During the winter months the following lectures were delivered by Members of the Institution:—1, On the Rotation of the Earth, by Mr. A. Bird; 2, On Iron and its Compounds, by Mr. W. Sumner, jun.; 3, On Sugar, by Mr. William Southall, jun.; 4, On Rhubarb, by Mr. William Southall, sen.; 5, On Potash, by Mr. C. F. Palmer. There was likewise a meeting held for the discussion of practical Pharmacy, at which Mr. Joseph Leay gave a very interesting account of the condition of Pharmacy in the Brazils. The lectures were of a very practical and instructive character, and we must tender our thanks to those who kindly gave the necessary time for their preparation. They were on the whole better attended than those of some previous sessions, though there is still room for improvement in this respect. The Committee wish to impress upon their fellow-members the great importance of this branch of the Society's operations, believing that, when properly carried out, it affords one of the most valuable sources of information and interest. Many of our junior Members have expressed a want of that elementary knowledge of Chemistry which can only be properly explained by a continuous and systematic course of lectures on this subject; the Committee are therefore endeavouring to make arrangements for a course of elementary lectures on Chemistry, to be delivered by the Professors at Queen's College during the winter, further particulars of which they hope shortly to announce. Considerable use has been made of the library and reading-room, though but few new books have been purchased during the past year. In conclusion, we would earnestly solicit the support of all resident Members of our profession in carrying out the objects for which the Institution was first organized; to the junior Members especially, the means of instruction afforded by the Society might be of the greatest service, if properly employed. We would further remind these, that as the doors of the Pharmaceutical Society of Great Britain are now closed, except to those who pass the examination, admission to the highest grade in the profession is not to be obtained without considerable scientific knowledge. All opportunity for instruction, whether afforded by lectures or diligent use of the library, must, therefore, become of great importance to those who desire to occupy a respectable position as Chemists and Druggists."

Statement of Cash Accounts for the Year ending Oct. 31st, 1853.

Dr.	£	*s.*	*d.*
Balance in hand	2	14	2
Surplus from Dinner Fund	0	18	0
Committee fines	0	1	6
Subscriptions	16	10	0
Proceeds from Mr. Bird's Lecture	1	4	0
	21	7	8

Cr.	£	*s.*	*d.*
Reporting	3	0	0
Rent	8	0	0
Stationery	4	12	7
Subscription to Cavendish Society	1	1	0
Mrs. King, for attendance	1	0	0
Postage	0	11	11
Refreshments for last Annual Meet.	0	10	2
Bookseller for stolen books	0	8	0
Retd. Committee Fine	0	0	6
Balance in hand	2	3	6
	21	7	8

We, the undersigned Auditors, have examined the above accounts, and find the same correct.

Birmingham, Nov. 17, 1853.

GEORGE CASSELL
H. J. ADKINS. } *Auditors.*

Mr. Williams moved the adoption of the report, and in doing so expressed the satisfaction he felt at the passing of the recent Act of Parliament, which ratified the association of Pharmaceutical Chemists. He referred to the establishment of the Birmingham and Midland Institute as an event likely to promote scientific improvement, and afford accommodation for holding the meetings of the Association.

Mr. W. Sumner, jun., seconded the resolution.

Mr. Jacob Bell made a few observations on the progress o the Pharmaceutical Society, and the stimulus which had been given to the exertions of the rising generation, as evidenced by the number of candidates who had recently come forward for examination. The favourable progress of the Society had received a temporary check from the hostility of two of its Members, who, adopting a construction of the Pharmacy Act adverse to the interests of the Society and its successful operation, had commenced proceedings in the Court of Queen's Bench, where alone the doubtful questions could be settled, conflicting opinions having been given by the legal advisers on each side. He adverted to the advantage which the Pharmaceutical students of Birmingham might derive from the lectures and other means of improvement at the Midland Institute, and noticed the mutual benefit arising from the affinity and co-operation of Institutions established with a common object—that of promoting education—although differing with regard to their special purposes and regulations. By dint of much labour and perseverance, the Pharmaceutical body had become united for the advantage and improvement of its Members, and he hoped nothing would occur, after what had been done, to impede the accomplishment of all that was desired.

The resolution having been adopted, Mr. Hollier moved the second resolution, appointing the officers for the ensuing year, and expressed his approval of such Institutions, observing that he was willing to afford his apprentices and assistants every facility for attending all the lectures given in Birmingham by the Society. He had always taken an interest in the Pharmaceutical Society, and believed it was calculated to effect a great improvement in the qualifications of the future Members, but for this purpose due attention must be paid to the education of young men. He regretted very much the existence of any disagreement among the Members, and had no sympathy with the tone of the opposition, even with regard to some points on which he had differed from the Council in opinion. He hoped the matters in dispute would be soon settled.

Dr. Heslop seconded the resolution, and said he should use his best influence with the gentlemen who had the management of the Queen's College to secure for the Pharmaceutical Students the benefit of lectures from the Professors of the College during the winter. He considered the advance made by the Pharmaceutical Society in obtaining the recognition of a class of Pharmaceutical Chemists, who would henceforth be required to pass an examination before assuming the title, to be a very important advantage to the medical profession, as the success of medical men greatly depended on the manner in which their instructions were carried out by the dispensers of medicine.

The resolution having been carried,

Mr. Southall, sen., made a few observations, addressed chiefly to the junior Members. He said the time was past when the education of a Pharmaceutical Chemist consisted in folding parcels and cleaning bottles. Something more was now expected of them; they were now recognised by the Legislature, and protected in the use of a peculiar title, of which they must prove themselves worthy. Any young man who wished to hold a good position, or even to pass muster among his fellows, must educate himself—he must take advantage of every opportunity to add to his stock of knowledge. The public would henceforth require it, and the young men would derive the benefit of it. They would be able to conduct their business with more satisfaction to themselves, and by enjoying the confidence of the profession and the public they would be better remunerated. They should also recollect that the tendency of sensual and intellectual pursuits was exactly opposite. The former tended to enervate the mind and impair the faculties—for example, a man addicted to drinking descended lower and lower until his mind became incapable of performing its proper functions, and it was the same with dissipation in general. But the cultivation of intellectual pursuits expanded and improved the mind, enabled a person to become master of the subject in which he was engaged, and as he proceeded he found increased facility in learning until by degrees the pleasure he derived from

study became the reward of his labour, in addition to which he had the satisfaction of knowing that he was fulfilling the good old maxim, "whatever is worth doing is worth doing well." The benefit of the improved education was not confined to the young men; their masters might also improve themselves. They were never too old to learn, and they would be obliged to exert themselves when they found their young men outstripping them in knowledge and practical experience. He was glad it was in contemplation to establish courses of lectures during the ensuing session, as he thought a course embracing an entire subject more useful than isolated lectures. If all the assistants and apprentices in Birmingham would attend, they might have a good elementary School of Pharmacy.

Dr. Nelson expressed his approval of the course the Chemists had been taking for the purpose of raising their status and qualification. He was an advocate for a compulsory examination of all those who professed to be Pharmaceutical Chemists, and he thought in that respect that the principle of the Pharmacy Act was a good one, as it was impossible to put down quackery altogether, but if no person was allowed to assume a name or title which did not justly belong to him, those who chose to patronise quacks would do so at their peril, and with their eyes open. Dr. Nelson concluded with a few practical remarks on the influence of legislation in raising the character of the profession, and expressed his desire to promote the objects for which the Pharmaceutical Society and the Birmingham Pharmaceutical Association had been founded.

After a few more observations of a general nature on this subject, the Secretary directed the attention of the Meeting to the specimens on the table, and described the mode of manufacturing bi-carbonate of soda from common salt. The specimens on the table illustrated every stage of the process. He also noticed the specimen of amorphous phosphorus exhibited by Messrs. Sturge, and which was absolutely pure, having no smell. The Chairman then described Mr. Boggett's gas plaster spatula.

Thanks having been voted to the Chairman and the gentlemen from whom the specimens had been received, the Meeting separated.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING.

The first meeting of the North British Branch of the above Society, for the present session, was held on Thursday evening, in the Society's rooms, 72, Princes Street, Edinburgh—Mr. J. F. Macfarlan, President, in the chair. The meeting was very numerous, the attendance including Dr. Inglis, President of the Royal College of Surgeons, Dr. Maclagan, Dr. Newbigging. Dr. Douglas Maclagan, Messrs. Baildon, Flockhart, Gardner, Robertson, Smith, Bremner, Mackay, Lindsay, Blanshard, Ainslie, Shaw, Finlayson, Roeding, Gray, &c. The Chairman read a note explaining Dr. Christison's unavoidable absence, the Professor having been suddenly telegraphed for at some distance from town, and, after a few introductory remarks, introduced Dr. Douglas Maclagan, who read an interesting paper on

THE ESSENTIAL OIL OF BITTER ALMONDS.

He commenced by observing, that attention had been directed in Edinburgh to this subject by the recent occurrence of a case of accidental poisoning, with a bottle of a flavouring substance marked quintessence of ratafia, and which was, in reality, oil of bitter almonds. Dr. George Wilson, who examined the poison in this case, had brought under the notice of the authorities the well-known fact that by chemical means the hydrocyanic acid might be separated from the hydruret of benzule, which forms the real flavouring ingredient, and that thus the great source of its poisonous properties might be removed. It was still matter of doubt, however, whether even after complete removal of the hydrocyanic acid, the hydruret of benzule was or was not poisonous, and Dr. Maclagan had made a series of experiments to satisfy himself on this point. The author first reviewed the processes for separating the prussic acid from the oil. Agitation of the oil with abundance of milk of lime and caustic potash, and subsequent distillation, appeared to be quite effectual; but as the addition of a salt of iron does no harm, and does not add materially to the expense,

and as this method had succeeded well with him, he was disposed to prefer it. The essential point seemed to be that the agents employed, should, by careful and sufficiently prolonged agitation, be brought into perfect contact with the oil. Dr. Maclagan said that it had been suggested that perhaps one distillation might be saved by adding the lime and potash to the marc of the almonds when the oil was first distilled. This appeared to him *à priori* to be unlikely, from the facility with which both the amygdalin and the emulsin of the bitter almond were acted on by alkalies, and accordingly he had found on actual trial, that under these circumstances, no oil was separated, but only an ammoniacal liquor distilled over.

Dr. Maclagan insisted on the absolute necessity, whatever process of purification was followed, of carefully testing the product for hydrocyanic acid. This was best done by agitating the oil briskly with aqua potassæ, passing through a wetted filter, and applying the iron test in the usual way to the filtrate. It was to the neglect of sufficient agitation with aqua potassæ that he ascribed the fact, that in oil in which no hydrocyanic acid had been detected, it had sometimes on subsequent trials been readily found. It had been suggested that possibly the hydrocyanic acid might not really exist in newly rectified oil, but might be re-developed in process of time. Dr. Maclagan showed that this was not the case, by a specimen of the rectified oil, prepared by himself twelve months ago, still being quite free from all trace of hydrocyanic acid, and moreover, not giving, under Lassaigne's potassium test, any trace of nitrogen, without which, of course, hydrocyanic acid could not be re-developed.

In relation to the more immediate question, whether or not the pure hydruret of benzule was poisonous, the author recapitulated the views and contradictory statements that had been made on this subject, and noticed the statement made in the posthumous volume of Dr. Pereira's *Materia Medica*, on the authority of Mitscherlich, that the pure oil was a poison. He then recounted his own experiments on animals, giving the preference for this purpose to dogs over rabbits, as being more fitted to test the probable effects of a poison on the human subject. He had experimented with both these kinds of animals. The experiments on dogs were five in number. These animals got respectively twenty-five minims, ℥i, ℥ij, and two of them ℥iij of the oil, and in no instance did death or urgent symptoms of any kind occur. Slight vomiting was produced by the ℥ij and ℥iij doses; but the escape of the animals could not be ascribed to this, because in one after a ℥iij dose, vomiting did not occur for twenty-five minutes; and in another after a similar quantity, the animal, within two minutes of its vomiting, passed urine, smelling strongly of the oil, which showed that it had been absorbed into the circulation. It was remarkable, that in some of these experiments, in which the animals were in no way seriously affected, the sample of oil furnished to him actually did retain some hydrocyanic acid, as shown by the iron test. It was satisfactory to find that this test could thus detect quantities of hydrocyanic acid too small to produce poisonous effects.

Dr. Maclagan then narrated his series of experiments upon rabbits :—

℥j. of the oil not entirely free from hydrocyanic acid produced no effect worthy of note for four hours, during which the animal was under observation. The rabbit was found in apparently perfect health next morning, and fed as usual, but died after thirty-nine hours. It was found to have inflammation of both lungs.

℥ij. of the same oil were given to another rabbit ; the animal fell on its side in eight minutes, with complete relaxation of all the muscles, and died in sixteen minutes, without further approach to convulsions than some twitching of the muscles of the head and neck.

℥ij. of another sample of oil, perfectly free from hydrocyanic acid, caused the animal to fall on its side in ten minutes, and it was moribund in nineteen minutes. Dr. Maclagan being desirous of trying the effect of cold affusion, practised it on this rabbit. It had the effect of temporarily making the breathing slower and more regular; but the animal died fifty minutes after taking the oil.

℥ij. of another sample of oil prepared by himself, and perfectly free from prussic acid, were given to a strong buck rabbit. No effect was produced for twenty minutes ; it looked a little dull, but revived shortly, and remained quite well for four hours and a half, during which it was under examination, but it died in the course of the night.

With the urine of these rabbits Dr. Maclagan was enabled to confirm the observation of Wöhler and Frerichs, that the oil in its passage through the system was

converted into hippuric acid, and if administered in a large quantity, partly passed unchanged into the urine.

To contrast the action of the oil on rabbits with that of other volatile oils, the author made some further experiments. ℥ij. of oil of carraway on a dog produced no other effect than slight vomiting. ℥j. of oil of cloves on a rabbit gave rise to no marked symptoms; but when ℥ij. of oil of cloves were given to a rabbit the animal fell motionless on its side in fifteen minutes, and died in an hour and a quarter. The symptoms were essentially the same as those produced by the rectified oil of bitter almonds, though the fatal result was not so speedy.

Dr. Maclagan summed up the evidence afforded by the experiments of himself and others by stating the following conclusions to which he had been led.

1. That the marked difference between rectified and unrectified oil shows that the poisonous action of the latter is essentially due to the hydrocyanic acid which it contains.

2. That the oil really free from hydrocyanic acid, in doses of a few drops, does not act as a poison on animals generally; and that the instances of fatal effects on man and animals from such doses of unrectified oil must be referred entirely to the hydrocyanic acid.

3. That experiments on rabbits with quantities of half-a-dram and under, invariably show that if quite free from prussic acid, such doses do not cause fatal effects. But in larger doses [a dram and upwards] it does, even when quite free from hydrocyanic acid, prove fatal to rabbits, but with great variation in respect to the rapidity of the death, which variation is due to the physiological peculiarities of these animals.

4. That dogs, whose organization renders them much better subjects for testing the probable effects of the substance on man, doses even so large as three drams of the oil, nearly or entirely free from prussic acid, produce no other effect than a little vomiting, and do not cause death or even dangerous symptoms.

5. That experiment shows that if this substance is to be called a poison at all, it must be regarded as one of no great activity: but that in reality it cannot, even on the ground of its effects on rabbits, be styled a poison, without including under that denomination many substances, such as oil of cloves, which cannot be regarded as poisons in the common sense acceptation of the term.

6. That the use of the purified oil to make flavouring condiments, is open to no objection which would not apply to ordinary aromatic volatile oils, and that the spirituous solutions sold for this purpose, if made of properly purified oil, are not dangerous.

7. That since by due care the oil can be so freed from hydrocyanic acid as to deprive it of active poisonous properties, great culpability will attach to the sale of preparations made with unrectified oil.

Mr. Mackay considered the paper now read to be very valuable, not only to the Members of the Society, but as a contribution to the scientific world at large, as setting completely at rest a question, which, up to the time of Dr. Maclagan's investigation, had been involved in obscurity and doubt. He might be allowed to state shortly as a guide to those parties who had not yet experimented upon the manufacture of the pure essential oil of bitter almonds, the results of his experience in this matter. The two methods recommended for the purpose of removing the hydrocyanic acid from the crude oil, were: 1st, distilling the oil with sulphate of iron and potash; and 2nd, distilling from slaked lime and potash. He had tried both, but had not found either of them produce a perfectly pure oil by *one* distillation. In his first experiments he used glass vessels, but found considerable difficulty in applying heat sufficient to bring over the oil, and at the same time prevent the very annoying *bumping* caused by the heavy materials in the body of the retort. By the first process, the whole of the product is apt to be destroyed by this taking place, and a minute quantity of the Prussian blue formed being thrown up, and mixing with the condensed oil, another distillation is rendered unavoidable. He found the second process more manageable, although liable to a certain extent to the same fault. The risk of breakage accompanied with the disposition to *bump* in both cases, suggested the following plan, which he found easy, rapid, and perfectly manageable. Using 16oz. of the unrectified commercial oil, he formed it into an emulsion with freshly slaked quicklime, and then added 24oz. solution of caustic potash. These

were put into a large bottle with three pints of water, and well shaken and allowed to remain for forty-eight hours with repeated agitation. This mixture was then poured into an ordinary copper still, tinned inside, with a pewter head and worm, and eight pints additional water added. A moderate fire was applied, and the oil gradually drawn over, with a portion of the water. The oil so produced had faint traces of prussic acid, but a second distillation from lime and potash rendered it perfectly pure. The water which distils over with the oil floats on its surface, and has a milky appearance, which is supposed to be owing to small particles of an oil lighter than the true essential oil, and which are floating about in the water. The heavy oil thus obtained requires to be kept under water, from its liability to become converted into benzoic acid. He concluded by expressing his opinion that in nearly every case a second distillation would be found necessary to free the oil *entirely* from the poisonous hydrocyanic acid.

Mr. Baildon thought now that the purification of the bitter almond oil had been brought so prominently forward, it was probable that some of the large houses in London would take the matter up, and hereafter offer the oil only in its rectified or pure form, and free from prussic acid. He further remarked, that the fatal case of poisoning from quintessence of ratafia, showed the necessity which existed for parties who manufactured such articles, being aware of their properties.

A vote of thanks was proposed by the Chairman to Dr. D. Maclagan for his able and valuable paper, which was carried by acclamation.

The Secretary then brought under the notice of the Meeting the Phytological Club in London, connected with the Pharmaceutical Society, and having shortly stated the intentions of the Association, urged those parties who were so disposed, to become Members, and by their co-operation assist in carrying out the objects which the Club had in view.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE DISCOVERY OF PHOSPHORUS—(Date 1669—1680.)

BY MR. JOSEPH INCE.

"Whether the Phosphorus Chemicus be good for something in physick, is yet a secret; many learned great men, that have not too great faith in Chemistry, hold it only for a curiosity, and say, if the Chymists had not found out the Phosphorus, they would have had but little or nothing new to show that is extraordinary." So writes Ambrose Godfrey Hanckwitz, in a pamphlet called *Historia Phosphori et Fama;* and how this new agent was discovered, it is the object of the present notice to explain. Godfrey himself, just at this period, had had bitter experience in the pretented skill of an alchymist, who contrived to live for more than a year at his expense. This worthy had been sent over from Holland by the Hon. Robert Boyle (Godfrey's master) with a commission to work out his grand experiments in the laboratory at Southampton Street, the whole of which were to be carefully reported at stated intervals. The result was very simple; he was boarded in the house, had a good salary, and did nothing. Therefore, when the first reports arose of a "new self-existing fire"—and the alchymists praised it in lofty and mysterious phrases—we are not surprised to find that Godfrey despised the men, and ridiculed their methods. "It is no wonder that few, or the fewest of them cannot produce it, for in truth and fact it is not a work for gentlemen and cabinet Chymists; but there is required for it an operator well versed in fires, to whom its mechanick and manipulation is well known. To me as an operator are these their high and subtile notions too strong, and I believe I must only make phosphorus still all my life for them." But there was a greater man in the field, and this was Brandt. "This honest man now gave himself before others the greatest trouble, without doubt many years, to find the key to the door of the garden of the Hesperi*dums*, and has erected himself for that purpose a vulcan office in the city of Hamburg, only the right bird of Hermes would not be catched." He made many experiments on the subject, but as Godfrey very properly says, "he should

have remembered the old story, 'Oh! King, what thou seekest is in thyself.'" A delicate way of expressing that phosphorus should be made from urine.

But Brandt did not wander long, and was enabled to produce "a dark, unctuous, dawbing mass," which was the first exhibition of phosphorus. Into what raptures discoveries like this threw the world at that primitive time, the following passage will show:—"When now such like noble motives, made that good old man, Brandt, to broil and to sweat much more by his excrements, one may easily guess how much at that time the whole heaven of Hamburgh did hang full of fiddles, as he brought forth out of it a lumen, which, in the world, is counted the most perfect agens intrinsicum. There was then cried nothing but triumph and victory among the Chymists. Those good people erected already in their thoughts so many hospitals and poor houses, that no beggar should ever more molest any man in the streets, made great legacies, and pious causes, and what not else."

A new light had evidently been thrown on the subject, and they made the most of it.

The alchymists joined in their congratulations. Their views on the matter were rather peculiar. "Besides the other alchymists did encourage him yet more, and desisted not to make him believe how this was that same fiery ghost of Moses that in the beginning moved upon the water, yea his splendid shining face: the fiery pillar in the desert, that secret fire of the altar wherewith Moses burned the golden calf, before he strewed it upon the fire, and made it potable." The first person who gained any knowledge of the new production was Dr. Kraft, who gave Brandt 200 dollars for a specimen, "for him to make remonstrances thereof to princes;" and next Kunckell. Both these two made it. But up to this period it was totally unpresentable, "because the unctuous dawbing oyliness was not yet accurately separated from it, and without doubt it was very stinking, and therefore unpleasant," until Boyle gave directions to his Chemist, Mr. Bilger, to produce it, and then to put it into the hands of Godfrey to prepare it for him. But Godfrey "had heard of battles," and long before Mr. Bilger could give him his instructions, sent one ounce of it, pure "right glacial," as we have it at this day.

This present Boyle received "with much satisfaction," and well he might, for although all that had been made had been praised on every side, and the Duke of Brunswick had performed experiments with it in presence of the renowned Leipnitz, "whom this new lumen did enlighten in such a manner, that he wrote extraordinary Latin poems upon it;" still (says the contented Hanckwitz), "the same with our solid prepared phosphorus was no more to be compared to ours than chalk to cheese, for that of Brandt remained only in such a confused form together, as a chaos." Godfrey now made a tour through Holland, France, Italy, and Germany, not for the benefit of his health, but to discover something new about "that marvellous lumen," and we have known some modern Chemists travel on the continent with equally extended views, though on a minor scale. But nowhere could he find anything prepared like his own, not even in France; for "had not France two renowned Chymists, the learned Homberg and Mons. Lemeric? And notwithstanding the French nation is of great ingenuity, activity, and penetration, yet we find not in their writings, nor by private correspondence, this fine product in quantity: nay, not at all that I can hear of." The conclusion to be arrived at is certainly this, that Brandt was the first to discover phosphorus and Godfrey the first to make it. His studies were not fatal to his health, for he died at the age of eighty, and bequeathed the light of other days as a legacy to his sons.

Of the exact process by which it was produced there is no mention made in any of Godfrey's accounts. His son seems to have felt an hereditary horror at divulging the important secret, as the following passage will show: "As to the phosphorus made of urine called Kunckell's, we have it described by the Hon. Mr. Boyle, Mons. Homberg, and others. But I shall beg to be excused for not discovering the process how I prepare it, or from giving any farther light into

its production than what was done by my father before the Royal Society, in the year 1733. Because I am now the only person in Europe, or at least in England, that can produce any quantity of it. And since it is a matter of curiosity, amazement, and diversion, more than of service towards the preservation of health to mankind, I am still the more excusable to conceal my method and to keep it a secret, that I may have the reward due to me, for discovering a better way of preparing it, and also for my trouble and expense, which is not a little." Cautious and quiet old gentleman—had he lived in later times he would have vended it as a patent medicine, and left the receipt to his widow, as a sort of soothing syrup. Fortunately, thanks to the old engraving on the subject, and the original furnaces, we are not much in the dark as to the mystery. It was prepared by slowly evaporating urine down to the consistence of honey, and submitting this to distillation in a retort enclosed in a brick furnace; it was subsequently purified as follows: "In the rectification of phosphorus the neck of the retort should be covered with tin, in order to retain the heat, and its nozzel should be immerged in water, and occasionally a little inflammable air should be introduced into the retort to prevent absorption of water, which would infallibly burst the vessels. The air is also useful, being one of the component parts of phosphorus. Four parts of phosphorus, and one of charcoal thus distilled makes phosphorus."

It is more than strange that a discovery which evidently caused so great a sensation should have led to so few practical results. For although many uses are assigned to it in books, its actual employment is very limited. Phosphorus is no longer at our fingers' ends in matches, and as a safe remedy in fevers, nervous affections, hemorrhage, and gout, it has almost passed away. It need not be stated that the mode of its preparation was long since changed by Pelletier, Fourcroy, and others. I believe, after all, its greatest efficacy is displayed in that celebrated compound phosphorus paste. To this I can add my personal experience. We have a kitchen, a fair average specimen, being a happy medium between the choleraic and the grand. The floor was thick with beetles, in one compact black mass. But following the guidance of the Journal, little pellets of the paste were strewed about, and the next morning the whole colony had disappeared; all but one solitary individual, who seemed deep in thought, and was possibly musing on the danger of venturing out to evening balls. But there is one application of phosphorus, now considerably revived, which should not be omitted, namely, in the treatment of the insane. The difficulty consists in its solution, and some excellent remarks on the subject may be found in the *Journal de Pharmacie*, October, 1834. Two forms are given:

Phosphorus, gr. iv.
Sulphuric ether, ʒj.

II.

Phosphorus, one part.
Olive oil, thirty parts.

The essential oils are said to dissolve it, in the proportion of six grains to an ounce, but one thing must be guarded against, none of these solutions are permanent.

After repeated trials I find that one grain to an ounce in oil, and two grains to an ounce in ether, &c., can only be relied upon. Most persons know the prescription of the author of *The Fallacies of the Faculty*:

℞ Phosphori, gr. ss.
Ol. succini, ʒss. ♏.

Still the only reliable solvent for phosphorus is chloroform. Surely any plan to alleviate the miseries of the insane must possess the deepest interest, and it is worth a trial to endeavour to alter the sad state of one so aptly described by the poet:

"A wandering bark upon whose pathway shone
All stars of heaven except the guiding one."

31, *Southampton Street, Covent Garden.*

ON MILDEW.

BY F. CRACE CALVERT, ESQ.

My attention has been at various times drawn to fabrics which had become mildewed after having been kept for a short time, or more frequently, when they have been shipped to warm and moist climates, as those of South America or East Indies, which are so favourable to cryptogramic vegetation. The production of mildew deserves the serious consideration of manufacturers who are engaged in producing goods for foreign markets, as not only affecting their pecuniary interests, but also as injuring the reputation of their goods in such markets. I am well aware that sometimes the blame does not rest with the manufacturer, bleacher, or finisher, but with the firm from which they receive orders; as they are called upon to produce a given quantity of goods from a certain weight of silk, which is highly prejudicial to the ultimate wear of the fabrics. It is a fact that thousands of pieces of silk have during the autumn and winter become covered with a white mildew, which, when allowed to remain, stained the fabric permanently. It is, for example, a common practice for a silk-dyer to receive 16 ozs. of raw silk, which he has to deprive of 43 ozs. of gum before he can dye it, and then he is expected to return from 32 to 36 ozs. of black silk, thus adding 24 ozs. of stuff to the 12 ozs. of genuine silk; and what renders this practice still more blamable is that a portion of these 24 ozs. is glue or gelatine, a substance which enters rapidily into decomposition and mildews. I would ask how such silk can resist wear and tear? And how can it be expected that such an amount of matter will not enter into decomposition when exposed to damp? It is well known in the trade that cotton goods are liable to similar deterioration. Fustians for example are highly charged with bone size; some of these fustians I have found to contain between sixteen and eighteen per cent. of foreign matter, of which bone size was the chief ingredient. Here again we have an animal matter disposed to ferment, and thus to produce that mildew so common in this class of goods. The pungent odour of the room where the fustian goods are stored shows that decomposition is already active. I regret to say that fustian is not the only class of cotton manufactures which contains heterogeneous matters, white calicoes are often highly weighted. I have some which my analysis proved to contain nine per cent. of mineral matters and nine per cent. of vegetable matter, or, to use a more explanatory term, "*of sour flour*," that is to say, wheat flour which has been placed in large vessels with water, and allowed to ferment, and thereby generate the germ of ultimate decay or disease. It is my conviction that such practice should not be followed, and that such stiffening should be rejected as well as rice flour, and only starch or farina flour used for the purposes, as they contain no azotised substances, which generally facilitates fermentation. To give an idea with what rapidity mildew is capable of being produced, I succeeded lately in generating it in candanas cloth, in the space of six or seven days, by simply moistening some pieces, and placing them in an obscure and warm spot. This rapid production was so much more interesting, as the goods were finished with only ground rice. I have often observed printed calico which had become mildewed, and no doubt the principal cause was, that rice or sour flour had been used in the finishing processes.

Dr. Henry Brown, of Manchester, who has had the kindness to examine for me some of the mildews under the microscope, states: "That there were several collections of fibres and granules between the crossed threads of the cloth, which exactly resembled the flacci and sporules of the fungus which he had frequently seen on the surface of mucilage that had been kept some time."

I believe all these remarks would be of comparatively little value to the trade, if I were not to publish here the materials I have found to prevent or impede the production of mildews, and these I give with perfect confidence, as they have been applied in manufactures, and have proved successful. To prevent size mixed with flour from becoming mildewed, I add about three parts of sulphate

of zinc to one hundred parts of flour, and then add to every gallon of the latter one ounce of arsenious acid, previously to the pieces being passed to the size. As to the mildew on silk, a silk manufacturer of Manchester has for the last two or three years cured such disease by a process which I discovered at the time, and therefore it cannot be published. I shall complete these remarks on mildew by stating that the greatest care should be taken to pack goods as dry as possible, and also that the present general mode of packing is not sufficient to protect them from external dirt or moisture, for I have found in several instances in which goods were returned from abroad, that the stains which were upon them did not come from mildew, but from dirt or colouring matter which had penetrated through the packing, which latter consisted of packing-cloth, oilcloth, and folds of paper. Therefore, a better mode of protecting goods to be sent abroad should be adopted.

Manchester, 17th November, 1853.

IMPORTATION OF WURRUS (CAPILA-PODIE DYE OF AINSLIE.)

A few days since we observed in the hands of a drug-broker in the city, a sample of this substance, of which one chest, imported from Bombay, was offered for sale as *Dragon's Blood.*

Wurrus is a brick-red powder, collected from the seed-vessels of a euphorbiaceous tree, *Rottlera tinctoria*, Roxb., occurring in Arabia, Eastern Africa, and in various parts of India. It is used in these countries as a dye for silk, and is also administered internally as a remedy in cutaneous disorders.* Examination with a good lens and solution in alcohol, readily distinguish it from Dragon's Blood, which is sometimes brought to Europe in the state of powder.

ON VOLUMETRICAL ANALYSIS.

There appears to have been recently a very general tendency among chemists to develope a method of quantitative determination, which although by no means new, has hitherto been little, or at least, only partially cultivated. The distinctive feature of this method is, that it does away with the necessity for collecting and weighing the compound, in which, according to the ordinary method, the substance to be determined is separated, by substituting for the operation of weighing a definite compound of the substance, the observation of the quantity of an appropriate reagent requisite to form a definite compound with that substance. The necessary quantity of the determinative reagent is ascertained by the measurement of a solution of known centigrade value, whence the term of volumetrical determination. Thus the principle upon which the method is based, is essentially the same as that of weight determination, it is an application of the law of definite combining proportions.

The first idea of this method appears to have been suggested by the observations of Richter on neutral saline solutions, which led the way to the discovery of the laws of chemical combination. But while the demonstration of those laws absorbed the attention of chemists to the exclusion of all other subjects, it was not to be expected that any progress should be made in perfecting the method until after the validity of those laws had been established, and our acquaintance with them had advanced beyond the hypothetical stage. The use of the balance was the only trustworthy means of deciding this question, and thus the means of demonstrating the truth of the laws became by custom and precedence the medium of their application in analytical operations. The while chemistry was in its nonage, when its utility and application in the arts were almost unthought of, the method of weight determination satisfied all the scientific requirements of precision and certainty, but when the approximative determination of certain substances became a daily desideratum in the factory and in commercial transactions, the time occupied by an analysis became as much an

* See also *Pharm. Journ.*, vol. xii., pp. 386, 589.

element of its value as accuracy. The apparatus for weight determination, the operations it involves, and the possible sources of error in unpractised hands, were likewise obstacles to its adoption. Thus a practical want gave rise to the introduction of the volumetrical method, which requires very simple apparatus and manipulation, and which has now received very general application.

The first volumetrical processes, introduced by Descroizilles, and improved by Gay Lussac, under the name of alkalimetry and acidimetry, are sufficiently well known, as are the various methods of chlorimetry and their application to the valuation of other substances, as manganese, &c. Within the last few months, the introduction of the volumetrical method has been enriched and improved by a great number of new and improved processes, as well as apparatus, some of the more important of which may be of interest to our readers.

The volumetrical determination of silver or chlorine, which in the form given to it by Gay Lussac is so admirably adapted to the valuation of alloys, loses some of its value, since it requires that the percentage of the element should be known approximatively, but this limited applicability has been obviated by Levol* through a very ingenious modification. When a solution of alkaline chloride is poured upon a precipitate of carbonate or phosphate of silver, there are formed chloride of silver and carbonate or phosphate of the alkali. Consequently, when a solution of nitrate of silver of known centigrade value is added to a solution containing alkaline chloride and phosphate, there cannot be any *permanent* ormation of phosphate of silver until the whole of the chlorine has combined with silver. This point is then indicated by the appearance of a yellow precipitate (phosphate of silver) communicating, after shaking, a faint but *permanent* yellow tinge to the precipitate.

Upon the same principle he effects the determination of sulphuric acid by mixing with the solution of a known weight of the substance, a few drops of a ten per cent. solution of iodide of potassium, and then adding from a burette a solution of nitrate of lead of knowu centigrade value. In both cases, it must be ascertained beforehand, that the salts to be examined do not contain any substance besides chlorine or sulphuric acid, which might be precipitated by the test solution.

An improvement in the chlorimetric process with arsenious acid, has been made by Penot,† which admits of the observation of the exact point when a sufficiency of the test-liquid has been added. He effects this by means of a test-paper, saturated with iodide of sodium and starch. The test-liquid is added to the solution of a known quantity of chloride of lime, until it no longer produces a blue colour on the test-paper. In this way the arsenious acid process is rendered superior to any other in practical value.

The cyanometrical processes of Fordos and Gelis by means of iodine, and that of Brunnquell‡ by means of protosulphate of iron, have already been described in this Journal. The latter appears to be one admirably calculated to answer the purpose for which it is intended. It would likewise seem from its more general applicability, to possess a considerable advantage over some other cyanometrical methods; for instance, that of Lieshing,§ which relates specially to the red prussiate of potash. Not the least merit of Brunnquell's memoir, is the adoption of a very happy method of ascertaining the point at which a sufficiency of the test-liquid has been added. It is this alone that renders the process of any practical value; it widens the range of the volumetrical method, and brings within it at least a great number of reactions, the products of which, like the Prussian blue formed in Brunnquell's process, are of an intense colour, and remain suspended in the liquid for a considerable time.

It is, perhaps, one of the chief defects of the volumetrical method at present that the processes are too special, the determinations being made in most cases by means of particular test-solutions, which are applicable to only one substance,

* Chem. Gaz. Oct. 1853.
† Chem. Gaz. June, 1853.
‡ Pharm. Journ., Nov. 1853.
§ Chem. Gaz., April, 1853.

and which are not always of so durable a nature as to admit of their being kept for any time without danger of alteration in their centigrade value. Indeed, the method has not as yet been in any degree systematized, and although there can be no doubt that even in its most perfect form a considerable variety of test-liquids will be necessary for the determination of different substances, there is still good reason to believe that the number may be much reduced by classifying the reactions by means of which the determinations are effected, and then selecting a reagent of such general applicability as to serve for the valuation of a greater or less number of substances.

A very important advance in this direction has been made by Bunsen* with regard to that class of reactions in which an oxidation or reduction takes place. Starting from a recognition of the capabilities of the method and the above-named technical defects, he has proposed to himself the task of substituting for a number of processes, one, relating to several substances and at the same time possessing considerable accuracy and facility of execution.

The principle involved in his process is the liberation of a quantity of iodine equivalent to the substance to be determined, and the determination of the iodine by means of sulphurous acid. The reaction between these two substances is expressed thus— $I, HO, SO_2 = HI, SO_3$.

By this process and with the same test-liquids he determines quantitatively mixtures and compounds of iodine, chlorine, bromine, chlorites, hypochlorites, sulphuretted hydrogen, sulphites, chromates, chlorates, arsenites; the peroxides of iron, manganese, lead, nickel, &c.; protoxide of iron, &c.

For these analyses three test-liquids are required; one containing 0.0025 grm. of iodine for each degree (0.5 cub. cent.) of the burette; another containing 0.03 of sulphurous acid to 100 of water; and a third containing about 1 grm. of pure iodide of potassium in 10 cub. cent. of water.

When it is required to determine the percentage of iodine contained in the commercial substance, or the quantity liberated by some previous reaction, it is dissolved in a solution of iodide of potassium, if not already in solution, and a measured quantity of the sulphurous acid solution added until the brown colour of the iodine disappears perfectly. To effect this an excess of the acid is required, and this excess must then be determined by mixing the liquid with a little starch solution, and then adding the iodine test-liquid from a burette until a blue colour begins to appear. After this the quantity of iodine required to decompose a measure of the sulphurous acid liquid must be ascertained, and from these data it is easy to calculate the required result.

Hypochlorates are valued according to this method by mixing a solution of a known weight of the salt with the solution of iodide of potassium, and adding hydrochloric acid until a slight acid reaction is caused. The iodine separated is then determined volumetrically, and thence the result calculated.

Besides a very great number of substances which effect the liberation of chlorine, those substances which are readily and completely oxidized by chlorine likewise come within the range of this method. The substance is heated with a known weight of bichromate of potash and strong hydrochloric acid, and the chlorine, of which three equivalents are disengaged for every two equivalents of chromic acid, passed into the solution of iodide of potassium. The quantity of iodine thus indirectly liberated by means of a known weight of the chromate is determined volumetrically, and gives by a simple calculation the percentage of chromic acid.

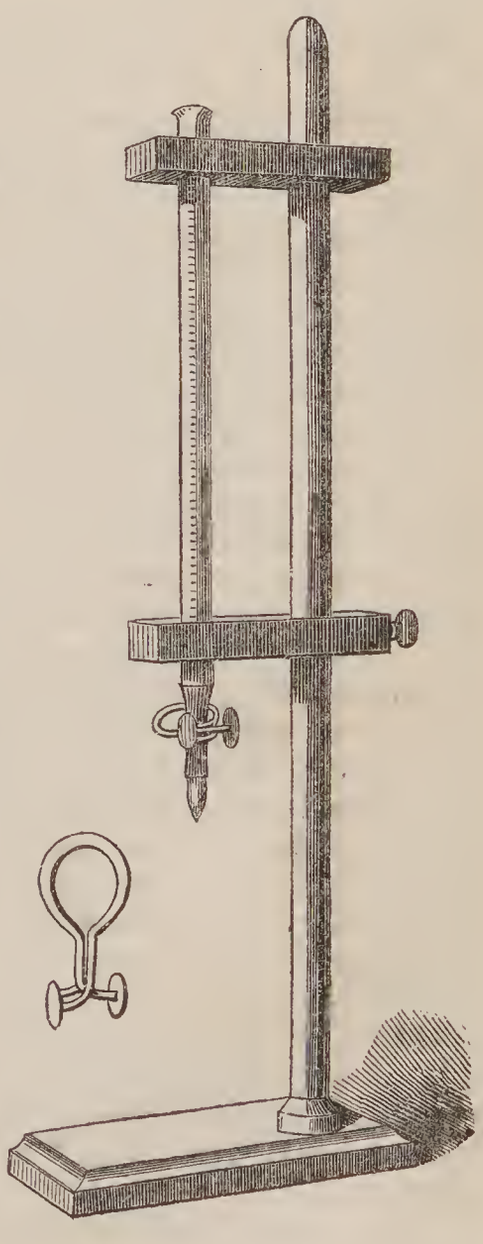
Among those who have directed their attention to this subject is Mohr. He has introduced several improvements into those determinations included under the terms of alkalimetry and acidimetry, as well as a new form of burette. He replaces the sulphuric acid hitherto used by oxalic acid, a substance which, in the crystallized form with three equivalents of water, is very definite, easily obtained, and not liable to undergo any alteration. The test-solution is prepared by dissolving one equivalent of the acid in a litre of water.

* Chemist, Nov., 1853.

The corresponding alkaline solution which he employs is caustic soda, which he has found on the whole preferable to ammonia. It is made of such centigrade value as to saturate an equal volume of the test-acid. In order to prevent the absorbtion of carbonic acid by this solution, it is preserved in a vessel closed by a cork, through which is inserted an ordinary chloride of calcium tube, filled with a mixture of finely powdered caustic lime and sulphate of soda. Mohr states that this plan is far more effectual than the use of ground stoppers, and he applies it likewise to the preservation of his stock of caustic alkalies, earths, &c. The freedom of the alkaline solution from carbonic acid is important, for otherwise the change of colour from red to blue in the litmus is less marked and sudden.

Mohr applies this process to the analysis of the compound ethers. Thus, if it is required to determine the value of acetic ether, which may contain alcohol and ordinary ether, a quantity of the ether is weighed, mixed with tincture of litmus; when free acid is present its quantity is determined with the alkaline test-liquid; then a measured excess of this liquid added, and the whole digested in a strong well-closed vessel in water, which is gradually heated to 212° F. In about half an hour the ether is perfectly decomposed and the liquid is still blue. The quantity of alkali remaining unsaturated is then determined with the test-acid, and this deducted from the quantity added in the first instance, gives the equivalent to the acetic acid of the ether.

The modified form of burette has been adopted on account of practical disadvantages attending the use of Gay Lussac's. With this latter instrument the quantity of test-liquid added cannot be observed during the flow, and the addition of small quantities is very difficult after the liquid has been allowed to run back.



After a number of trials with stop-cocks, Mohr was at last led to give the preference to a form of instrument of which, through the kindness of Mr. Griffin, we are enabled to give a drawing. It consists of a tube of moderate diameter, contracted at the lower extremity and graduated. To the contracted portion of the tube is fitted a small piece of vulcanized caoutchouc tube, furnished with a small spout made of glass tube. The place of a cock is supplied by a wire bent at right angles in opposite directions and furnished at the ends with knobs, so that when these are pressed between the finger and thumb the part of the wire which closes the caoutchouc tube is opened, and the liquid in the burette allowed to flow or drop as may be desired. The volume of test-liquid used is indicated by the difference of level on the burette at the commencement and end of the experiment.

This instrument, called by Mohr a pressure-cock, is by no means costly; it may be adapted to syphons, and used for various other purposes. The burette constructed with it renders all kinds of volumetrical determinations very easy, and there can be no doubt that by means of it the pharmaceutist will in many instances be enabled to make very advantageous applications of this method to the valuation of the various commercial substances and medicinal preparations with which he has to do.

A NEW AND SIMPLE FORM OF ELECTRICAL MACHINE.

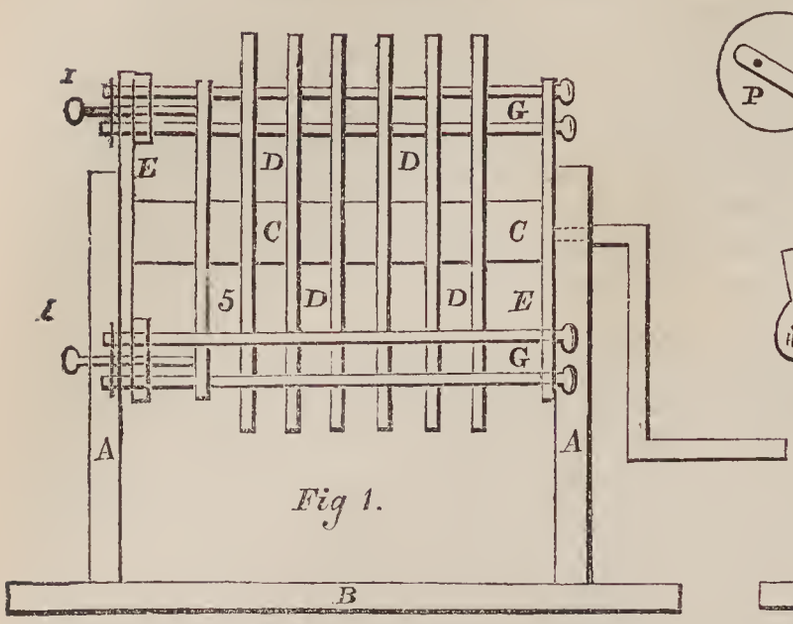


Fig 1.

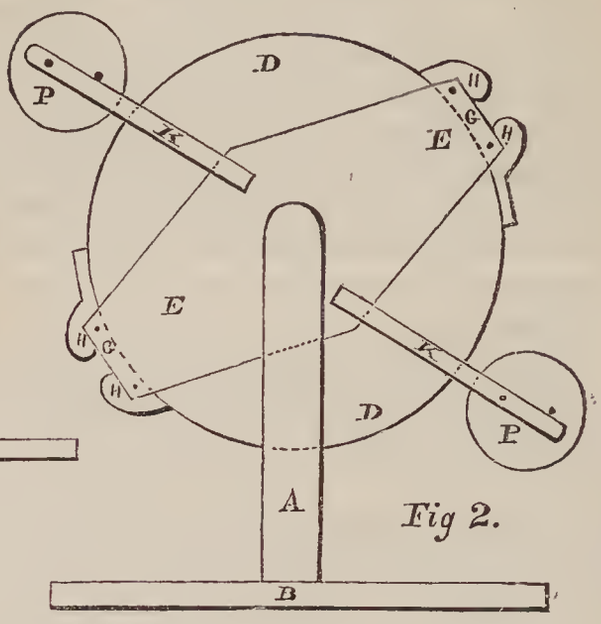


Fig 2.

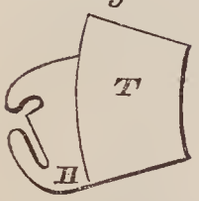


Fig 3.

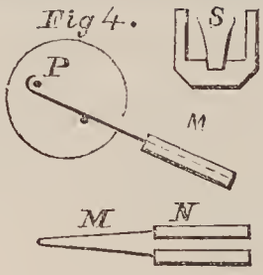


Fig 4.

Fig 6.

Fig 5.

The following is a description of an electrical machine which I have lately constructed, and which I believe has the following advantages over those generally in use: it may be made entirely by the amateur himself, of cheap and easily managed materials; it is not liable to breakage, no glass being used; should any part be damaged, it may be easily repaired, and if kept secured from the dust, it is always ready for use, as it does not require the drying which glass machines need, I have frequently used the small one I have made, when the barometer stood at "Change," in a room where fire was never lit, and procured a ready supply of electricity.

A B, figs. 1 and 2, are the wooden stand and supports of the machine; C the axle, which is triangular, made of wood, covered with gutta percha and resin; D D are circular plates, ten or twelve inches in diameter, quarter-inch thick, with a triangular hole in the centre, so that they may slide easily on the axle, and made of two parts resin and one part gutta percha, melted in an oven and well mixed. These plates will perhaps be rather troublesome to make, as moisture must be avoided, and it will be difficult in rolling them out, to prevent the material sticking to the roller, but after a little practice and patience, the operator will understand his material; an addition of about one-tenth of white wax makes it more workable, but it appears also to make it more brittle. The number of these plates may of course vary; E E are pieces of the same composition, fixed to the uprights A, to receive G G, four stout brass wires, No. 6 or 8, to carry the rubbers fig. 3, which are placed between the plates; the part H is made of wood, and cut in the manner represented, so that they may be placed on the wires or removed without disturbing the plates, and yet not be moved by the revolution of the machine. The cushion T is made of six or eight folds of very soft flannel, covered with cat or rabbit skin. I intend trying mole skins, which if equally excitable, will be preferable, as having a short and soft, yet tough fur. Fig. 5 is a piece of the composition with a hole in the centre, to allow the axle to revolve freely, and the corners are cut away to allow it to slide between the four rubber wires; I I are two wooden screws working in E between the wires, which pressing against fig. 5, screw up the whole of the

plates and rubbers so as to produce the necessary friction; K K are solid cylinders, made of equal quantities of gutta percha and shellac, and adapted to the pieces E E, to support the conductors P, a section of which is shown in fig. 4 (they are omitted in fig. 1); P is made of sheet copper or brass, bent into a cylindrical shape, but with a slit of a quarter-inch left open; the ends are made of wood, or the composition, and supported on two wires passing through the conductors; one of these wires goes also through K, the other wire rests against K, so as to allow the conductors to be removed from their places easily. The collectors M are made of small copper wire, and slide upon the wires that pass through the conductors. The part N is made of very thin brass, jagged so as to present a series of points at the sides of the plates; this brass is covered with gutta percha, shown in section as large as is required, fig. 6, where S represents the brass. The gutta percha serves the double purpose of keeping the brass from scratching the plates, and preventing the escape of the electricity from the points; it is easily shaped in a wooden mould.

Dunster, Somerset, 14th November, 1853. W. Symons.

ON CREOSOTE.

BY V. GORUP BESANEZ.

This substance, which since the time of its discovery has rarely been the subject of scientific investigation, has recently been studied by the author. Our acquaintance with its chemical history has always been exceedingly imperfect, and became much more confused when it was ascertained that phenylic acid possessed characters whose resemblance to those of creosote was so great as to suggest the opinion that they were really identical, and that the differences presented by the substances bearing these names were owing only to accidental admixtures. This view has gradually gained acceptance among chemists, and finds a considerable support in the fact that the greater part of the creosote of commerce at the present time is no other than an impure phenylic acid. Gmelin* has unconditionally adopted this view in his Chemistry, and treats of creosote and phenylic acid as synonymous terms for one and the same substance, thus denying the existence of creosote as a chemical individual.

It is indeed certain that almost all the substances introduced into commerce from the western part of Germany under the name of Creosote consist essentially of phenylic acid, and are obtained from coal tar, as may readily be ascertained by a determination of the boiling point, the behaviour with perchloride of iron, &c.; but it is on the other hand quite as certain that under this name a substance is sold by certain firms at a much higher price, which both in its general chemical characteristics, boiling point, and elementary composition, corresponds almost exactly with the statements made as to these data by Reichenbach,† and at a later date by Ettling‡, statements which are well known to relate to a substance obtained by the destructive distillation of wood. This substance does not present any one of the reactions which are characteristic of phenylic acid, and on decomposition yields products which are essentially different from those of phenylic acid.

It would be an indispensable preliminary of any thorough investigation of the chemical history of creosote to prepare the substance from its original source, for it is only by this means that the conditions of its formation and purification can be ascertained. The latter operation is sufficiently well known to be tedious as well as difficult; and it seems that the circumstance observed by Voelckel with regard to the volatile oil lighter than water, produced by the distillation of wood, presents itself likewise in the case of creosote; namely, that these oleagenous products are tolerably numerous and apparently very analogous in composition. But the decision of the question whether Reichenbach's creosote is identical with phenylic acid, or whether by the distillation of wood products are formed which possess the characters stated by Reichenbach, and thus differ essentially from phenylic acid, is altogether independent of these circumstances, presupposing that there is sufficient evidence

* *Handbuch d. Chemie.* † Liebig's *Annalen*, vi. 202. ‡ Ibid., vi. 209.

that the material operated upon has really been obtained by the distillation of wood, and that its characters correspond with the statements of Reichenbach and Ettling relating to creosote, either perfectly, or at least more fully, than is the case with phenylic acid.

The author considers that his observations have removed all doubt on this point, and has therefore made them known, although he admits their imperfection in other respects.

The material which he operated upon was procured from Batka, of Prague, by whom, as well as by Professor Buchner and Lerch, he was assured that it was prepared from the tar of wood, chiefly beech, at Dobriss (Bohemia), and at Blansko (Moravia), according to the method originally proposed by Reichenbach. Its appearance and general characters corresponded perfectly with the statements of Reichenbach—a strongly refractive oleagenous liquid, of a faint yellowish colour, with a peculiar penetrating disagreeable odour resembling smoke, and altogether different from that of phenylic acid. To the taste it was burning and acrid; it produced a white spot upon the mucous membrane of the tongue, and caused a temporary cessation of hemorrhage by coagulating the albumen. A splinter of pine-wood, moistened with hydrochloric acid and dipped into the liquid, did not present the slightest trace of a blue or violet colour, nor did perchloride of iron free from acid produce any blue colour, as it does even in very dilute solutions of phenylic acid. Extreme cold did not cause the crystallization of the liquid. The specific gravity varied between 1.046 and 1.049. It was perfectly soluble in ether, alcohol, and sulphuret of carbon—only partially soluble in acetic acid.

When heated, a feeble ebullition commenced at 194° Fahr., and a milky liquid passed over with a very fetid oil, lighter than water. The temperature rose to 320° Fahr., at which point the ebullition nearly ceased. The distillate was then clear, and possessed a peculiar odour different from that of the raw material. At 390° Fahr. the ebullition became more rapid, and an oily substance passed over while the temperature rose to 398° Fahr., and then remained stationary for some time, after which it rose slowly to 407° Fahr. and 421° Fahr. before the last portions had passed over.

These variations in the boiling point indicate that the raw material consisted of a mixture of several substances. The circumstances that by far the greatest portion distilled over between 398° Fahr. and 407° Fahr., and that the former temperature, which is stated to be the boiling point of creosote, remained constant for some time, show that this substance, if it is to be regarded as possessing chemical individuality, constituted the principal part of the raw material.

With a view to obtain the pure substance, a large quantity of the raw material was distilled, and the portion passing over between 398° and 407° Fahr., collected, rectified, digested for some days with melted chloride of calcium, and again distilled. It was then observed, that though the temperature remained constant at 398° F. for some time, it still rose, though gradually, during the distillation.

The substance thus obtained, gave on analysis :

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	Ettling. IX.	Ettling. X.
Carbon	75.32	75.72	75.54	74.76	75.82	75.02	74.78	74.68	75.72	74.53
Hydrogen	7.84	7.94	7.85	7.95	7.98	7.95	7.98	7.84	7.80	7.87
Oxygen	16.84	16.34	16.61	17.29	16.30	17.03	17.24	17.48	16.48	17.60
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

In its physical and chemical characters it corresponded so perfectly with the statements of Reichenbach and Ettling, that there could be no doubt as to its being essentially distinct from phenylic acid, and identical with the substance examined by those chemists.

The author is inclined to the opinion that the substance thus obtained was not quite pure, but contained some admixture, and he considers the variation in the percentage of carbon to warrant such an inference. In any case he considers that the formulæ hitherto assigned for creosote are incorrect, for $C_{14}\ H_8\ O_2$, requires 7.40 hydrogen, and $C_{12}\ H_7\ O_2$, 7.37 hydrogen, while the minimum in his analyses is 7.84, and the whole of the results for hydrogen correspond exceedingly well. The formula which agrees best with his results and those of Ettling, is $C_{26}\ H_{16}\ O_4$, and this, although it does not perfectly agree with the above analytical data, he considers, from an exami-

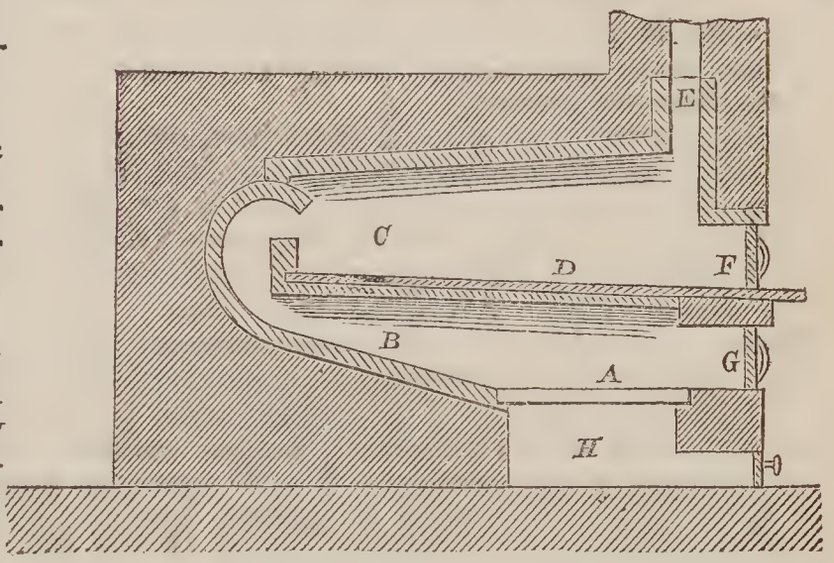
nation of some chlorinated compounds of creosote, to be the true formula for the pure substance.

He was unable to obtain the substances which are said to be formed by the action of potassium and dry hydrate of potash upon creosote, but he observed that by the action of alkalies at a high temperature, a substance is produced, which he believes to be identical with the capnomor of Reichenbach.

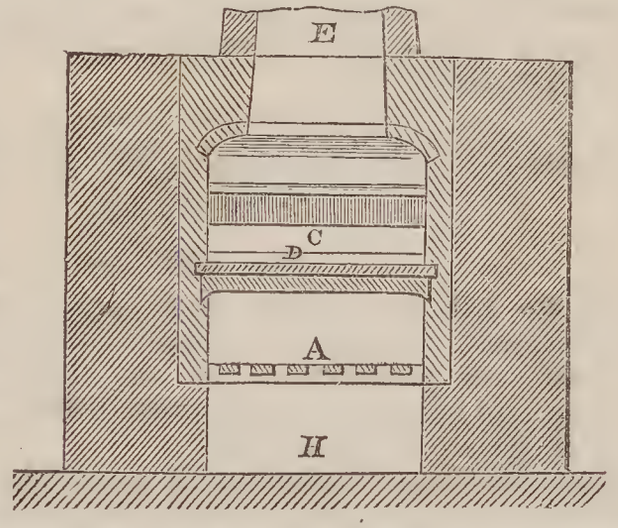
Finally, with regard to the practical determination of the nature of commercial substances bearing the name of creosote, he considers the best and most trustworthy tests of the presence of phenylic acid are the boiling point, and the behaviour with perchloride of iron or concentrated acetic acid, in which phenylic acid is perfectly dissolved at a moderate temperature.—*Annalen der Chemie und Pharmacie*, May, 1853.

PROCESS FOR THE MANUFACTURE OF CYANIDE OF POTASSIUM BY MEANS OF ATMOSPHERIC NITROGEN.

This process, which was patented in 1846 by M. Armengaud, differs from those previously adopted, in the circumstance that the atmospheric air used is mixed with water-vapour, for the purpose of facilitating the formation of cyanogen by means of its hydrogen.



A current of air previously heated and saturated with water-vapour is forced by some appropriate arrangement into a chamber charged with combustible material; the gases produced by the combustion are then forced through a column of wood, charcoal, or coke heated to redness, from which they pass into an intimate mixture of carbonaceous substance and carbonate of potash, soda, or lime, according to the kind of cyanogen compound required. This mixture must be kept at a cherry-red heat. The current of moist air is kept up until all the carbonate is converted into cyanide. The mixture is then removed and washed with water, in closed vats, until all the soluble substances are extracted With the solution thus obtained all the cyanogen compounds may be prepared as usual.



The volatile products resulting from the combustion and the conversion of the carbonated alkali into cyanide escape through the chimney; they may be made use of by passing them through a pipe into an acid or into a solution of some salt, as sulphate of iron, and then working the liquid as usual for ammoniacal salts.

The accompanying figures represent a vertical and a horizontal section of the furnace used in this operation; it is built of bricks, and the walls, which are exposed to strong heat, are lined with fire-bricks.

A is a grate of bar iron upon which rests the fuel, into which the heated moist air is forced; B is a channel filled with wood charcoal or coke, through which the gaseous products of combustion pass; C is an arched chamber lined with fire-bricks, the floor being formed by the cast-iron plate D, resting upon the roof of the fireplace.

This chamber is charged with the mixture of wood charcoal and carbonated alkali. The mixture must contain more carbon than is sufficient for the reduction of the carbonate and the formation of cyanide; wood charcoal is the best material.

E is the chimney through which the gases escape; at a certain height a damper is fixed, by means of which the chimney may be closed, so that the gases are forced through a tube dipping into acid.

F is the opening for charging and emptying the chamber; it is closed by an iron door. G is the opening for feeding the fire.—Armengaud's *Génie Industriel*, June, 1853.

MEANS OF DETECTING THE PRESENCE OF TURPENTINE IN MINERAL NAPHTHA AND IN OIL OF AMBER.

BY DR. BOLLEY.

It is well known that these substances are not unfrequently adulterated with turpentine, the smell of which is entirely concealed by that of the naphtha or amber oil. It is, however, for many purposes by no means indifferent whether these substances are pure or not. The author was therefore induced to undertake the examination of a number of specimens of amber oil, and found most of the commercial kinds adulterated.

As the means of detecting this adulteration is likewise applicable to naphtha, he examined a number of specimens of this, and found the same adulteration.

The agent which he employs as a test is dry hydrochloric acid, which forms with turpentine the so-called artificial camphor—hydrochlorate of camphen—while it does not give rise to the formation of any solid product either in amber oil or naphtha when they are pure. But when turpentine is present, the formation of the solid substance takes place so readily, and is so characteristic, that it leaves no uncertainty.

The apparatus which the author employs consists of a tubulated retort, from which is evolved a slow stream of hydrochloric acid gas, passing then through two small Woulf's bottles filled with coarsely broken chloride of calcium, from which it passes into the liquid to be examined. This is contained in a cylindrical glass vessel about one foot in height, and placed in a wider cylinder, which is kept well cooled by a freezing mixture. The disengagement of gas must be continued for about an hour. Mixtures containing 5 per cent. of turpentine when thus treated and allowed to stand for twelve hours, gave unmistakable indications of the adulteration.—*Schweizerisches Gewerbeblatt*, 1853.

ON THE CAUSE OF THE LUMINOSITY OF CERTAIN BODIES WHEN HEATED.

BY A. SCHRÖTTER.

Naturalists are still at variance with regard to the luminosity of bodies at ordinary temperatures. Schrötter originally intended only to institute researches into the luminosity of phosphorus, but was afterwards led to examine whether similar phenomena are not presented by other bodies. This has been shown to be the case with sulphur, selenium, and arsenic.

Berzelius considered that phosphorus only gave light in consequence of evaporation. Fischer, on the other hand, ascribed its luminosity to a gradual oxidation. Marchand concluded from his investigations that phosphorus emits light from both causes—evaporation and oxidation.

Schrötter denies the correctness of several of the experiments instituted by Marchand, and shows in the following investigations, that phosphorus is luminous only in consequence of oxidation.

Under the bell of the air-pump the luminosity of phosphorus is at first somewhat increased, but on further exhaustion it continues unchanged. When the barometer has sunk to 1 millim., there rises from the phosphorus, about 10 or 15 minutes after the commencement of the exhaustion, a luminous exhalation; this soon fills the whole of the bell-glass with a luminous, opaque, bluish atmosphere, through which the phosphorus cannot be recognized. In from half a minute to a minute afterwards, this luminous atmosphere diminishes again about the stick of phosphorus, which then reappears. Everything now remains dark, even when the bell-glass is warmed. If the exhaustion be continued after the phosphorus has begun to be luminous, nothing

is produced but a light alternately over each cylinder at each stroke of the piston. The introduction of a very small quantity of air into the bell causes this to become filled for a short time with a luminous atmosphere. This is a beautiful experiment, which may be repeated three or four times.

If exhaustion alone were the cause of the luminosity, it must appear in the bell-glass instantaneously on each up-stroke of the piston, for it is visible in the cylinder, which can only take place when phosphoric gas, given off by the phosphorus under the bell-glass, passes into the cylinder. The phenomenon may be explained without difficulty by oxidation. Thus, as phosphorus requires very little oxygen to become luminous, and as no phosphoric gas can be produced in the presence of free oxygen without becoming oxidized immediately, the phosphorus continues to shine for some time even with considerable exhaustion of air. At last, however, the quantity of oxygen must be so reduced, that it is overbalanced by the phosphoric gas formed : the latter will then become diffused in the bell-glass, taking up however at the same time the last portions of oxygen with production of light ; in this manner the phenomena above described will be produced.

In a Torricellian vacuum of 265 cubic centims., phosphorus did not exhibit the least luminosity (in contradiction to the statements of Berzelius) even when the tube was held as obliquely as possible, by which the vacuum was diminished about half, the phosphorus heated to boiling, and the tube then rapidly brought back into a vertical position. The phosphorus was sublimed into the upper part of the tube, where it attached itself in thin shining laminæ. Phosphorus can therefore evaporate very quickly without becoming luminous; and this negative result is conclusive, because a luminosity continuing during some time could be explained by the supposition that some air was present, and would not consequently have spoken decisively in favour of the evaporation view.

When phosphorus was introduced into a bell-glass, moistened internally and closed with mercury, containing about 800 cubic centims. of pure hydrogen gas produced by electrolysis, it gave out light for about a quarter of an hour. The bell-glass was then surrounded with hot water, so as to raise the temperature to 176°—194° F., when not the least luminosity was produced, although such a rapid evaporation of the phosphorus took place, that the walls of the glass were covered with fine globules of sublimed phosphorus. This negative experiment also is conclusive against the evaporation view. The luminosity at the commencement arises evidently from the presence of a small quantity of air, the complete removal of which from so large a bell-glass is quite impossible.

As Marchand affirmed that the luminosity of phosphorus continued without interruption even in gases which contained no traces of oxygen when these were only passed over it, the author made this experiment with hydrogen gas obtained both by electrolysis and by the ordinary method with zinc and sulphuric acid. The gas produced by electrolysiswas passed from a Bunsen's flask through a horizontal tube cemented to it ; and the arrangement was so contrived, that the whole apparatus, before the commencement of the evolution of hydrogen gas, was filled with fluid, so that the gas had to pass through no air. No India-rubber tube was employed for the union, but the whole apparatus consisted as it were of one piece. The phosphorus was not in the least luminous, even when it was considerably heated.

In the experiments with hydrogen prepared in this manner, the arrangement was so contrived that the gas was first of all rendered completely pure and inodorous by caustic potash, sulphuric acid, &c., and then passed into a tube about two metres in length, the first half of which, or that nearest the apparatus for the evolution of the gas, contained copper-turnings which had been previously carefully cleaned and heated in hydrogen gas ; whilst the second half, which was closed by means of a bent tube, the end of which dipped into water, contained the phosphorus. This portion of the tube projected through a hole into a dark room, whilst the remainder of the apparatus remained outside. The phosphorus continued luminous even after the gas had been passing uninterruptedly through the tube for more than six hours, and would apparently have continued so, as long as any of it remained ; but when the copper-turnings were heated to a slight red heat, the luminosity of the phosphorus immediately disappeared, re-appearing as brightly as before on the copper being allowed to cool.

As long as the copper was heated, so as to take up oxygen, and the phosphorus was not luminous, the cork through which the tube dipping into the water passed

was luminous on its inner surface ; when the stream of gas was strong, the bubbles were also luminous ; but as the copper cooled and the phosphorus became luminous, the luminosity of the cork was no longer visible. Thus when the phosphorus is not luminous, the gas in passing takes up phosphoric gas, which, meeting with a thin layer of oxygen on the inner surface of the cork (penetrating by diffusion) gives rise to the luminosity of that part of the apparatus. But as soon as the phosphorus becomes luminous, it consumes the small quantity of oxygen contained in the gas, and no more phosphoric gas reaches the cork.—*Sitzungsber der Akad. der Wiss. zu Wien, Math. Naturw.*, p. 414.

PREPARATION OF A DRYING OIL FOR ZINC PAINT.

In order to avoid the use of oxide of lead in making drying oil for zinc paint, oxide of manganese has been proposed as a substitute. The process to be adopted is as follows :—

The manganese is broken into pieces about the size of peas, dried, and the powder separated by means of a sieve. The fragments are then to be introduced into a bag made of iron wire gauze. This is hung in the oil contained in an iron or copper vessel, and the whole heated gently for twenty-four or thirty-six hours. The oil must not be allowed to boil, in which case there is great danger of its running over When the oil has acquired a reddish colour it is to be poured into an appropriate. vessel to clear.

For 100 parts of oil ten of oxide of manganese may be employed, which will serve for several operations when freshly broken and the dust separated. Experience has shown, that when fresh oxide of manganese is used, it is better to introduce it into the oil upon the second day. The process likewise occupies a longer time with fresh oxide. Very great care is requisite in this operation to prevent accident, and one of the principal points to be observed is, that the oil is not overheated. If the boiling should render the oil too thick, this may be remedied by an addition of turpentine after it has thoroughly cooled.—*Allg. Polytech., Zeitung.*

MEANS OF DETECTING AND SEPARATING COPPER FROM BRANDY.

Böttger* states, that when a few drops of olive-oil are added to brandy containing copper, the whole well shaken and allowed to stand until the oil has perfectly separated, it has a greenish colour, and contains the whole of the copper salt which was present in the brandy.

POISONING BY ACONITUM NAPELLUS.

In the *Times* of November 10th is the report of a case of poisoning by aconite root, taken by mistake for horseradish, from which it appears that Mr. Joseph Russell, of Chard, Somersetshire, being on a visit to his brother in Bristol, partook of some roast beef for dinner, and having expressed a wish for horseradish, some was procured from the garden and dressed in the usual manner. It was remarked at the time that it must be very bad horseradish, as it did not possess the usual flavour. Soon after dinner Joseph Russell complained of a peculiar tingling sensation in his hands and arms, which rapidly increased. Brandy was given, and medical aid instantly procured, but he rapidly sank, and died in about an hour. His brother experienced the same sensations in a slighter degree, and is now recovered. On examination it was found the root was that of *Aconitum napellus*. An inquest was held on the body of the deceased, and a verdict was returned of "Died of strong narcotic poison, *Aconitum napellus*, taken in mistake for horseradish." A similar case is mentioned by Dr. Pereira (*Materia Medica*, vol. ii., page 2170, Third Edition); and in a foot-note by the editors another case is mentioned (reported in the *Times* of Nov. 4, 1842), in which the same root was taken by mistake for horseradish.

* Polytechn. Notizblatt, 1853. No. 3.

OBITUARY.

On the 5th of November, at King's Parade, Cambridge, Isaiah Deck, F.G.S., aged 61. Mr. Deck did not enjoy the advantages of early scientific education; but he made up for this deficiency by study and research, and devoted considerable attention to chemistry, geology, and archæology. The extent of his practical knowledge brought his services into requisition as an operative chemist, and he was frequently consulted on subjects relating to geology, mineralogy, &c. In the course of his life he made a rather extensive collection of objects interesting in a scientific point of view, and he had a numerous acquaintance among men of eminence in the branches of science to which he directed his attention. While zealously devoted to these pursuits he did not neglect his duties as a Pharmaceutical Chemist; but was one of those who combined the professional with the commercial functions of his calling, and was one of the earliest and most sincere supporters of the Pharmaceutical Society.

BOOKS RECEIVED.

Förteckning på Naturalster, Fabrikater, Instrumenter och Konstsaker, *samlade under en resa* 1851—1852, *och å Kongl. Carolinska Institutet utställda till beskådning under Augusti*, 1853, *af* N. P. Hamberg. Stockholm, 8vo, pp. 28. 1853.

(*Catalogue of Objects of Natural History, Manufactured Products, Instruments, and Works of Art, collected during a Journey in* 1851—1852, *and deposited for exhibition during August*, 1853, *at the Royal Caroline Institution, by N. P. Hamberg*).

The Microscope, *in its Special Application to Vegetable Anatomy and Physiology*. By Dr. Hermann Schacht. Translated by Frederick Currey, Esq. M.A. With numerous Illustrations. (Forming No. 1 of "Highley's Library of Science and Art.") London: Samuel Highley, 32, Fleet Street. 1853.

The Pathology and Treatment of Pulmonary Tuberculosis, &c. By John Hughes Bennett, M.D., F.R.S.E., &c., &c. Edinburgh: Sutherland and Knox; London: Simpkin, Marshall, and Co. 1853.

A Treatise on Dentistry, *and the Care and Preservation of the Teeth*. By Samuel Fowell, Dentist. London: Simpkin, Marshall, and Co., Stationers' Hall Court. 1853.

The Druggists' Hand-Book of Practical Receipts, *a Manual for the use of the Chemist and Medical Practitioner;* comprising the London Pharmacopœia in English, with the medicines, their uses and modes of preparation; and formulæ for trade preparations, mineral waters, powders, beverages, dietætic articles, perfumery, cosmetics, &c. A Glossary of the terms used in Chemistry and Medicine, including old names, contractions, vulgar and scientific denominations. With a copious Index to all the preparations. By Thomas F. Branston. Liverpool: Edward Howell, Church Street. 1853.

An Explanation of Chemical and Pharmaceutical Processes, *with the Methods of Testing the Purity of the Preparations*. Deduced from original experiments. By Dr. G. C. Wittstein. Translated and edited from the second German edition. By Stephen Darby, Practical Pharmaceutist. London: John Churchill, Princes Street, Soho. 1853.

To English Pharmaceutists Mr. Darby's translation of Dr. Wittstein's work on Practical Pharmaceutical Chemistry, supplies that which has long been wanted. Pharmaceutists, especially those who have not had much experience in the laboratory, often feel the want, in works on scientific chemistry, of those minute practical details so essential to obtain successful results. It is the design of the work before us to supply this information. The greater portion of it was originally published in the *Repertorium für der Pharmacie*. For the purpose of bringing the work within the reach of those for whom it is chiefly intended, the translator has omitted such matter as, bearing more on scientific chemistry, is not absolutely necessary for the Pharmaceutist, intending at some future time to publish it as a supplement to the present volume.

The notice of the Second part of the Second volume of Dr. Pereira's *Elements of Materia Medica* is deferred until next month.

TO CORRESPONDENTS.

Enquirer.—Pelletier has directed *Biniodide of Quinine* to be made by rubbing together equal quantities of iodine and quina, dissolving the compound in proof spirit, and crystallizing it.

M. H. A. (Sheffield). The name *Carvacrol* has been given to one of the supposed constituents of oil of carraway. It is obtained by adding hydrate of potassa to the oil, and submitting the mixture to distillation. The carvacrol is left in the retort in combination with the potash, from which it is separated by the addition of sulphuric acid and renewed distillation,

Tyro.—(1). Pyroligneous acid is acetic acid, the former name being given to it when obtained from wood, and especially when retaining an empyreumatic flavour.—(2). Apply the tests for sulphuric acid and alumina.

R. W. (Oxford).—The method adopted for getting the inner surface of a globe covered with crystals of camphor, is simply to put a few pieces of camphor into the vessel, and expose it to the light.

Newcastle.—Castor oil may be filtered through a conical flannel bag in a warm room.

Marcus (Leeds), wishes to know how he can recover the tartaric acid from acidulated kali, which has lost its effervescing property. If he studies the process by which tartaric acid is manufactured, which, as a Pharmaceutist, he ought to understand, he cannot be at a loss as to the mode of effecting his object.

E. J. A. (Bedford).—The deposit sent is probably citrate of lime, but we have not examined it;—our Correspondent should do so himself.

W. B. (Stroud).—(1). We presume our Correspondent has got hold of the wrong name.—(2). Yes.

B. J. (Brompton.)—The description referred to is, we conceive, incorrect. It was, probably, not written by Mr. Phillips. The salt is incompatible with free mineral acids.

Amplificator (Exeter) should apply to Mr. Pepper for the explanations he requires.

Novice (Exeter).—Chloride of silver may be reduced by putting it into water acidulated with hydrochloric acid, together with metallic zinc or iron.

A. B.—Subsulphate of mercury, or turpeth mineral.

Omega.—(1.) The blue tinge imparted to steel is regulated by the degrec of heat to which it has been subjected.—(2.) An optician would supply the remedy.

Primus (Bradford).—"German yeast" is very generally used, and answers the purpose as well as "brewers' yeast."

W. B. W. (Southampton).—We should suppose *Malva* is intended.

H. Ridley.—*Studens.*—We are unable to answer these questions.

J. Ll. Ll. (Llandilo).—Liquid glue. See vol. xii., page 392.

J. C. B. (Bath).—The term *Chinese* is applied to the kind of rhubarb commercially called East Indian.

W. H. H. (Peckham).—(1.) The natural system.—(2.) No ; the questions are not the same.—(3.) Lindley's Medical Botany.

M. P. S. (Potteries) proposes the establishment of a branch of the Pharmaceutical Society in the Potteries, comprising six large and important towns. He recommends this step as being likely to prove highly beneficial to assistants and apprentices as well as to their employers, in which we fully concur; but the proposition would have had more weight if authenticated with the name of the writer.

E. B. V.—(Oct. 27th).—The person who wrote the letter must have been in jest. No sane man would make such a proposition in earnest.

Iota (Manchester) states that he is an apprentice, and that his master keeps him at work from 7 A.M. until 10 P.M., and *will not allow him to read any work on chemistry.* There is no law regulating the hours apprentices are kept at work (except in factories), but the terms of the indentures impose on the master a legal obligation to teach his apprentice the art and mystery of his business.

O. C. (Bath).—See advice to apprentices and students, vol. xii., page 314.

I. R. D. (Huddersfield).—The author of the advertisement is, we should think, liable to prosecution by the Society of Apothecaries.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL' Princes Street. Other communications to the Editor, 15, Langham Place·

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. VII.—JANUARY 1st, 1854.

THE ELECTION AND REMOVAL OF MEMBERS OF THE PHARMACEUTICAL SOCIETY.

The power of electing and removing Members is vested in the Council. Prior to the incorporation of the Society, this power was restricted only by the provisional regulations adopted at its formation, which defined the objects of the Society, and provided that it should consist, in the first instance, of such established Chemists and Druggists as should voluntarily come forward in aid of its objects and intentions. These regulations were amplified from time to time as occasion required.

The Charter defined more minutely the classes of persons of whom the Society should consist, and provided that it should be lawful for the Council to make Bye-laws for regulating among other matters of detail, the mode of electing and removing Members.

Keeping in view the ultimate object of the Society, namely, the establishment of an examination to be passed by future Members, but having no power either to compel candidates to come forward, or to controul those who might not be so disposed, the Council proceeded gradually in the introduction of the new system, making exceptions in favour of persons of a certain standing in the trade, or having been Associates of the Society before a certain date, and at the same time somewhat limiting the powers they might have exercised under the Charter with regard to the admission of other persons. The early examinations were of a lenient character, and the regulations with regard to admission were so framed as to encourage young men to come forward as candidates, while care was taken that the laws should not have a retrospective operation which might be oppressive or unjust. The Pharmacy Act, which confirmed the Charter in general terms (save such parts as it altered or repealed) specially confirmed the power vested in the Council to make Bye-laws, but altered the mode of confirmation, substituting for the confirmation by three meetings of the Council, the confirmation and approval by a Special General Meeting, and by the Secretary of State. But in order to enable the business of the Society to proceed without interruption from the time of the passing of the Act, the existing Bye-laws were confirmed until the ensuing Annual Meeting in May, being a period of about eleven months.

We have stated that the then existing Bye-laws in some degree limited the powers conferred by the Charter with regard to the admission of Members. The Charter recognised as eligible for election four classes of persons; namely, 1st, persons who were in business at the date of the Charter; or 2nd, who should have been examined; or 3rd, who should have been certified to be duly qualified; or 4th, who should be persons elected as superintendents; and these provisions were advisedly so framed, that the Council might from time to time define or limit the conditions of membership by Bye-laws, which they could alter or repeal as occasion might require. But the Act which was passed on the 30th of June, 1852, having confirmed the then existing Bye-laws until the ensuing month of May, the conditions defined in those Bye-laws were absolute during the interval; and although the Act gave power to make and establish new Bye-laws, none could be made during the period in question which should be repugnant to the then existing Bye-laws. The passing of the Act was an event which altered the position of the Society, afforded an additional inducement to join it, and at the same time a strong ground for restoring for a limited time the full powers conferred by the Charter, of electing as Members, without examination, persons who were *actually in business as Pharmaceutical Chemists at the date of the Act*, and *who should be certified to be duly qualified.* This was the liberal construction of the Act, which, according to the unanimous opinion of the Members, backed by the legal advisers of the Society, it was desirable to adopt; and resolutions to this effect were passed at a Special General Meeting in London, and at several local meetings in different parts of the country. (See *Pharmaceutical Journal*, vol. xii., p. 104, &c.)

The parties in whose favour it was proposed to grant this indulgence were those who commenced business on their own account after the date of the Charter, and prior to the date of the Act, who, according to the powers conferred by the Charter, were eligible for election *on being certified to be duly qualified*, but who were *temporarily* excluded by one of the then existing Bye-laws, which remained in force until the Annual Meeting in May. The mode of attaining the desired object was very simple. A Bye-law was made, fixing a day (namely, the 1st of May, 1853), prior to which applications of Candidates for admission should be received, and their names entered on a provisional register of Chemists and Druggists, certified to be duly qualified for admission. It was not repugnant to the then existing Bye-laws to register the names of such candidates, and the Act expressly provides, that the Registrar shall make, in addition to certain registers specified, "such other registers as may be required by the Council, and may be necessary for giving effect to the Bye-laws of the Society and to the provisions of the Act."

On the first of May the reception of the names of candidates terminated, on the 18th of May the register was finally closed. On that day the Bye-law which had interposed, the only obstacle to the election of the parties whose names were on that register, ceased to be in force, and at a subsequent meeting of the Council* the election took place in accordance with the terms of the new Bye-law.

While the laws of the Society define the terms and conditions upon which persons become eligible for election as Members, the final decision is vested in the Council, who, in the first place, ascertain by a due examination of the certificates and credentials whether the required conditions have been complied with, and then proceed to vote on the question of election. This is usually determined by a show of hands, but a ballot may be demanded by any Member; the question is decided by the majority, or in case of an equality of votes, by the casting vote of the Chairman. The exclusive principles which prevail in clubs, where two or three black balls, or in some cases even one, will negative an election, would not be compatible with the constitution and objects of the Pharmaceutical Society, in which it is desirable to include all duly qualified Pharmaceutical Chemists; and although each member of the Council has the power of voting according to his discretion, the election follows almost as a matter of course on the approval of the certificates.

The regulations with regard to the removal of Members from the Society are more stringent. A majority of votes or the casting vote of the Chairman is not sufficient in this case. The Charter provides that not less than twelve Members of Council shall be present, and not less than three-fourths of the Members present shall consent to the motion for removal. The Bye-laws also require that every facility shall be given for an explanation or defence—that notice of motion shall be given, and the notice inserted on the summons to each Member of the Council. These regulations are very properly intended to guard against the possibility of a hasty or arbitrary decision founded on prejudice or personal feeling. In the usual course an interval of not less than two months elapses between the commencement of the proceedings and the conclusion; and, considering the large majority required, and the opportunity given for the investigation and discussion of the merits of the case, the preponderance is greatly on the side of leniency.

This has been exemplified in the case reported in the Transactions of the Society for the present month, as the motion for removal was lost, although opposed by only two Members of the Council besides the party concerned, whose conduct no Member of the Society has attempted to justify. After the strong expression of opinion by the Members at large, the Council could not dismiss the subject without coming to a vote. As it is probable that the result

* The delay in the confirmation of the Bye-laws by Lord Palmerston prevented the election of these Members at the time intended, namely, at the meeting of the Council in June, which has caused some confusion, as the Bye-law fixing the amount of Annual Subscription for Members elected before July 1st, 1853, was intended to apply to all the new Members elected on certificate. This accident may be rectified by passing a new Bye-law.

may occasion some dissatisfaction, we may observe that a majority of the Council acted in accordance with the expressed wishes of their constituents, and on the other side it should be borne in mind that the expulsion of a Member who is in the position of plaintiff in an action against the Society, might be liable to misconstruction, as persons unacquainted with the history of the transaction might be led to suppose that the decision in favour of such expulsion was influenced by the recent occurrence in the Court of Queen's Bench. It was therefore a question whether the motion, however justifiable on its merits, was expedient under existing circumstances.

A SENSE OF PUBLIC DUTY.

* * * "This deponent further saith, that as a Member of the said Society, this deponent "considers that he has a public duty to perform, and is responsible to the legislature and also to "the public, for a proper and faithful administration of the said powers, duties, and respon- "sibilities, vested in the said Society as aforesaid."—*Affidavit of William Dickinson.*

A MAN who pursues a straightforward course in the performance of his duty, regardless of personal risk and inconvenience, and in spite of sneers and opposition, is entitled to respect, and one who voluntarily assumes the entire responsibility of administering the affairs of a Society in defiance of his colleagues and fellow Members, must have a remarkably good opinion of himself to back his estimate of the public duty which devolves on him.

The author of the affidavit above quoted, is not satisfied to share the responsibility of office with his colleagues. He imputes to them the dishonesty of wilfully violating the law, in direct opposition to the opinion of their legal advisers, and he comes forward, as the good Samaritan, to rescue the Society from the hands of these "dishonest persons," being actuated, according to his own statement, solely by a sense of public duty. Although his assertion respecting the legal advice the Council are said to have received, is totally unfounded, it may be fair to assume that he believes their position to be vulnerable, and when a man believes, or has reason to suspect that a breach of the law is being committed, his own conscience must decide whether it be his duty to take up the cudgels or not.

There is a class of persons who are so sensitive on certain points of law, that if it should come to the knowledge of any of them that a neighbour has given a receipt without affixing a stamp as the Act directs, or keeps any taxable commodity without making a due return, or evades the payment of a turnpike, &c., the sense of "public duty" is so strong that the said delinquents are straightway proceeded against with the utmost rigour of the law. It cannot be denied that the class of persons to whom we refer render some service to the public by intimidating the dishonest, and thus promoting obedience to the laws; nevertheless the public requite these good offices with ingratitude, and common informers are scarcely tolerated in respectable society.

But common informers have strong grounds for their proceedings compared with those on which the prosecution of the Pharmaceutical Society has been undertaken; for they are supported not merely by a legal opinion, taken on an *exparte* case, but by the undisputed fact that the offences which they bring to light are frauds which no honest man could sanction or extenuate. It cannot be urged against them that there is a doubt as to the legal interpretation of the Act, or that from some ambiguity or defect in its phraseology the law (*according to their interpretation of it*) would be "more honoured in the breach than in the observance." Neither can it be said that the act or omission in the cases in which their services are called into requisition does injury to no one, but that on the contrary it is calculated to promote the object for which the law was passed. Not one of these pleas can be urged against the avocation of the common informer. His crusade is against positive delinquency, which admits of no defence except the general one of "not guilty." Yet the public are so ungrateful as to look down upon common informers as a degraded class of persons.

In what light then must we view the man who having been appointed one of the representatives of an important society, takes advantage of a doubt in the

construction of an Act of Parliament as a pretext for quarrelling with his colleagues, and while they are backed by the Members at large and by their legal advisers in the opinion that the course they have taken is legal, calculated to promote the interests of the Society, and the welfare of the public, he pursues his hostility into a court of law?

Even if the Court should decide in favour of the points for which he is contending, this would not inculpate the Council. They have used their utmost endeavours to carry out honestly and faithfully the intentions of the Act. If they should not be supported in the interpretation of its provisions, which they believe to be the correct one, this would prove that the Act is defective, and the responsibility would rest, not on the Council, but on one member of it who took the most prominent part in passing the Act. It is worthy of remark, that this is the individual whose exertions on the behalf of the Society have excited the jealousy and consequent animosity of Mr. Dickinson—that he has constantly endeavoured to frustrate these exertions by opposition, abusive language, and misrepresentations calculated to raise jealousy and dissension—that he extended his hostility to the other Members of the Council, *because* they neither sympathised with nor sanctioned this conduct—that on a proposition for his removal from the Society being entertained, he came forward in the capacity of public prosecutor, and pretended that he had been "goaded on" by an attack! and, lastly, that he resents this *pretended* attack upon himself by endeavouring to procure the expulsion of nearly 1000 Members from the Society! He now pretends that he is impelled by a sense of public duty. At what date this tender regard for the laws of his country came on is uncertain, but on the 11th of May, when the amount of a fee was under discussion, he said that "if the fee had been fixed at five guineas instead of ten he should not have opposed it, although he maintained that it would be *illegal* to demand even that amount." Are we to infer that he has abjured his previous laxity of principle and fallen on his feet at last, or that his sense of public duty is subservient to and regulated by the *animus* with which he carries on his hostilities?

THE LIBRARY AND MUSEUM OF THE PHARMACEUTICAL SOCIETY.

During the continuance of strife and litigation, the regular business of the Pharmaceutical Society is in some degree thrown in the shade. Before the dispute arose, the prospects were in every respect encouraging. The Society having weathered the storms of opposition from without, was in good repute, and rapidly gaining accessions of strength and influence, until the hostility of two or three Members occasioned a temporary check to the onward progress, by involving the Council in doubt and perplexity.

We may hope that this state of affairs will not be of long duration, and that on the settlement of the questions in dispute, the Council will be enabled to devote their undivided energy and attention to the regular business and interests of the Society.

Among other subjects which require supervision and improvement, we may advert to the Library and Museum. The Library, although probably the best of the kind in the country, is very far from complete. It contains a considerable number of the standard works and periodicals on Chemistry, Pharmacy, and the allied sciences, and for the ordinary purposes of the student, it furnishes facilities for improvement rarely to be met with, but as a library of reference belonging to a Society representing Pharmacy in this country, it must be admitted that it is defective. The recent regulation for the circulation of the books makes it still more necessary to devote attention to the subject, as the completeness of the library as a library for reference, is diminished in proportion to the advantage which is taken of the privilege of borrowing books.

It was always the intention of the Council to establish a Circulating Library, containing the works generally required by Students, and such as the Members might desire to read at their leisure; but it was originally in contemplation to effect this object by the purchase of duplicate copies of the works to be circulated,

in order to leave the original library intact for the use of those who might attend at the house of the Society. It was found, however, that the library was not so much resorted to as the Council had anticipated, and on a proposition being made for the circulation of the books, it was carried without opposition, as a means of bringing the library into more immediate use.

The privilege thus granted has been taken advantage of to some extent, and it may be expected that the books will, by degrees, become more generally in demand, as the junior members of the Society having been brought up in a different manner from their predecessors are more likely to appreciate the opportunities of improvement thus afforded. It is therefore desirable to revert to the original intentions of the Council when the funds of the Society admit of the establishment of a separate library for circulation, and the enlargement of the collection of works in the library for reference. This library ought in its department to equal in rank and importance the library of the Royal College of Surgeons, and there is no reason to doubt the practicability of placing it on this footing in the course of a few years, provided the funds of the Society are not wasted in litigation.

The Museum also demands constant attention, and a renewal of those specimens which deteriorate from keeping, as well as the addition from time to time of other specimens illustrating the progress of discovery or improvements in manufacture. The Museum is already a valuable and important one, and the space allotted to this department is almost entirely occupied. There are three cases of specimens, many of them very interesting and valuable, the property of the late Dr. Pereira, which will be transferred to the collection of the Society as soon as arrangements can be made for their reception and exhibition in the Museum. There is, however, very little vacant space either in the Museum or the Library for additional cases, and it will be necessary to consider in what manner these departments of the Society can be extended and made more complete.

In about five years a period will occur in the lease of the house, which will afford an opportunity of either removing to more spacious premises, or entering into any arrangements that may be found practicable for the extension of the space now occupied. It has been suggested that it would be desirable to look out for a freehold site and build a house or college on a scale suitable for all the purposes of the Society; and it has been proposed to raise the requisite capital by debentures or shares, bearing five per cent. interest, to be paid off by instalments, or to lapse on the principle of a tontine. Considering the large number of Members and the probable amount of income derivable from fees in addition to the annual subscription of those who joined the Society under the old system, there is nothing to prevent the accomplishment of this object, and the completion of a building worthy of the Pharmaceutists of Great Britain and the profession which they are endeavouring to elevate and improve.

The Royal College of Physicians is provided with a spacious edifice in Pall Mall, where meetings are held and conversazioni occasionally given, and if that body possessed a revenue adequate to the efficient support of the establishment, the institution might become a centre of attraction to the scientific world, and its proceedings might conduce to uphold the dignity and importance of the College, and at the same time to promote the advancement of medical science.

The Royal College of Surgeons is also possessed of a large and commodious building, a museum and library almost unrivalled, and this institution is resorted to by its members and their friends for mutual improvement. It is maintained at considerable expense, and a grant was recently obtained from the Government for its further extension.

The Pharmaceutical Chemists have the opportunity of becoming the third class in the profession, the Apothecaries having merged into the College of Surgeons, and Pharmacy having taken up its proper position as a distinct branch, unconnected with the practice of medicine or surgery. The Pharmaceutical Chemists, therefore, ought to possess an establishment not inferior in scale and importance to those to which we have referred; and if they will persevere in their

exertions, and avoid quarelling with each other, they possess the means of raising up an institution which would reflect credit on themselves and their profession.

THE RESPONSIBILITY OF THE PHARMACEUTICAL CHEMIST.

When a serious accident occurs from the administration of an overdose of a strong medicine, the first inquiry which is made is, Whether it was taken under medical advice? When this was not the case the next inquiry is, Where was it procured—did the Chemist give the needful directions? If the result was fatal, this leads to a searching investigation at the inquest, and unless the Chemist can show that he used proper precautions, he may expect to receive a reprimand from the Coroner, or a similar expression in a rider, appended to the verdict of the jury.

Sometimes the reflections cast upon the Chemist on these occasions are unjust, and he is held to be responsible for the imprudence or carelessness of persons who either disregarded his instructions or gave him no opportunity of furnishing the requisite information. At a recent inquest on a lady, who died from taking lozenges containing calomel, the Coroner and the Jury imputed blame to the Chemist for alleged negligence in this respect. We have reported several cases of fatal accidents to sheep from the use of a wash containing arsenic, and have had occasion to point out what appeared to us to be undue severity in the verdict against the vendor. In proportion to the progress of education among Pharmaceutists more is expected of them, and a qualified man is more likely to be severely dealt with in the event of an accident arising from drugs purchased of him, than a huckster or general dealer would have been under similar circumstances. The reason is obvious: in the former case the purchaser trusts to the experience of a person in whom he has confidence; in the latter he takes the responsibility on himself.

In the case of patent or secret medicines the responsibility rests chiefly with the purchaser. He sees an advertisement recommending a medicine in strong terms as a certain cure for a variety of disorders, and "to be had of all respectable chemists, grocers," &c. He applies to a Chemist who is ignorant of the composition or properties of the medicine, and executes the order without pledging himself to the veracity of the advertisement or the printed envelope. If he were to recommend it, or express a favourable opinion as to its qualities, he would, to some extent, make himself responsible, and in the event of mischief arising from its use, he would be liable to censure. The maker of a proprietory medicine or nostrum would incur liability if it should prove deleterious or dangerous, while he recommends it as a safe remedy, and this is the case also where a medicine is administered casually across the counter. We have always maintained that the qualified Pharmaceutical Chemist is less likely to incur such risk, than one who is not acquainted with his business; first, because his knowledge enables him to guard against danger; secondly, because, having a character to lose, he has an additional inducement to be cautious. It is now generally admitted that *posology*, or a knowledge of the doses of medicines, forms a necessary part of the education of the Pharmaceutist, and this is included among the subjects of examination at the Pharmaceutical Society. The possession of this knowledge does not imply any interference with the province of the medical practitioner, but it is requisite as a precaution against accidents, and for the convenience of the public in the use of domestic medicines in cases where medical advice is not necessary. It is also important that the dispenser should be able, from his knowledge of the ordinary doses, to prevent mischief in the event of a mistake occurring in a prescription. To what extent he would be responsible for failing to guard against the consequences of such an oversight, is a question which would depend on circumstances. If, for example, the mistake were an important one, resulting in loss of life, the Chemist could scarcely exculpate himself, although sanctioned by medical authority; for it is well known that all men are occasionally liable to accidents, and it is one of the duties of the dispenser to exercise his sagacity and prudence when a "*lapsus pennæ*" comes under his observation.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL,

held on Wednesday, December 7th, 1853, it was

Moved by Mr. J. B. Edwards, seconded by Mr. D. B. Hanbury, "That Mr. William Dickinson be expelled from this Society, the Pharmaceutical Society of Great Britain."

Votes being taken by show of hands, there were

For the motion..... 11
Against the motion..... 3
(One Member did not vote.)

The President declared to Mr. Dickinson that he was expelled from the Society.

Mr. Dickinson retired from the Council-room.

Immediately on the retirement of Mr. Dickinson it occurred to the Council, that as there had been one Member present at the voting who had not voted, the announcement made by the President might be erroneous, the Charter requiring that in the removal of a Member, the consent of three-fourths of those present, is a necessary condition. It was therefore arranged that a letter, of which the following is a copy, should be addressed by the President to Mr. Dickinson, and be delivered immediately by the Secretary :—

"17, *Bloomsbury Square*, *December 7th*, 1853.

"SIR,—I consider it proper to acquaint you immediately of that which may be considered an error in announcing the result of the motion for your expulsion from the Society.

"There were present at the meeting of the Council 15 Members, including yourself.

"Of these 15 Members, there voted for the motion.....11
Against the motion, including yourself, there were 3
And of the 15, there was one who did not vote 1

"Under these circumstances I am of opinion that the declaration that you were expelled is erroneous.

"I am Sir, your obedient servant,
HENRY DEANE, *President*."

"*To* Mr. DICKINSON.

SPECIAL MEETING OF THE COUNCIL, *December* 14, 1853.

The President reported that he had received a copy of a rule *nisi* against the Council and against the Registrar, and had instructed the solicitors to take steps in defence of the Society.

(COPY) RULE NISI.

"Thursday, the twenty-fourth day of November, in the seventeenth year of the reign of Queen Victoria.

"*In the Queen's Bench.*

"MIDDLESEX.—Upon reading the several affidavits of William Dickinson and the printed books and printed papers and paper writings thereto annexed of Charles Hastings Collette, and the paper writings thereto annexed, and of William O'Connor, and the paper writings thereto annexed, It is ordered that the first day of the next term be given to the Registrar and the Council of the Pharmaceutical Society of Great Britain to show cause why a writ of mandamus should not issue directed to them, commanding them and each of them re-

spectively to make out and maintain a complete register of all persons being Members of the said Society, and also of all persons being Associates and Apprentices or Students respectively, and to make and keep a proper index of the said register; and also to make and maintain a complete register of all persons being Pharmaceutical Chemists in Great Britain, and to make and keep a proper index of the said register, in conformity with the Act of Parliament of the 15th and 16th years of Her present Majesty, chapter 56, upon notice of this rule to be given to the said Registrar and to the said Council, or to their Clerk or Secretary, in the meantime.

"On the motion of Sir Fitzroy Kelly. "By the Court."

The President reported that he had received the following letter from Mr. Bastick, in reference to a former communication which had been laid before the Council at the meeting in October:—

"Sir,—I learn that a letter which I addressed to you on the 11th of October last has been laid before the Council of the Pharmaceutical Society, and its purport misconstrued by the Members of that body into a resignation of the office which I hold as one of the Board of Examiners.

"As I neither did, nor do at present intend to resign that office, I beg that you will be good enough either to withdraw the letter which has admitted of such misconstruction, or to place this one before the Council at the earliest opportunity, so that my intentions may be clearly understood, and so that any proceedings which may have taken place upon the misapprehension of my former letter may be reconsidered.

"Permit me to state, that the reason why I absent myself from the Board of Examiners, *instead* of resigning my post at that Board, is, simply, that I do not intend, by any act of mine, to avoid the expulsion from the Society with which I am, or have been threatened, although I wish, at the same time, to act as far as I can consistently with this intention with delicacy towards those Members of the Board of Examiners who have evinced so much hostility towards me. Hence my determination to absent myself from the Board while questions affecting me personally are under the consideration of the Council.

"Apologising that any obscurity in my former hastily written letter should occasion you further trouble.

"I am, Sir, your most obedient servant,
"Wm. Bastick,
2, Brook Street, Bond Street,
Nov. 3rd, 1853."

"*To* Henry Deane, Esq.
President of the Pharmaceutical Society.

Resolved, "That Mr. Bastick's letter to the President, dated November 3, be published in the Transactions of the Society."

LIST OF CANDIDATES WHO HAVE PASSED THE EXAMINATIONS.

(*Continued*).

MAJOR EXAMINATIONS.

Bartley, Thos. Nicholas...Cheltenham
Bennett, Robert.....Lincoln
*Betts, George Wm.....Spalding
*Brett, Edward N. .....Newbury
*Borland, John .....Kilmarnock
Clark, Wm. Williams ....Oakham
*Clifford, John R. S. .....London
Cotton, John Lovering...Barnstaple
*Dines, Thomas .....London
*Dru, Casimir, T. A. .....Mauritius
*Dyson, William B.....Wakefield
Evans, William H.....Haverfordwest
*Fairbarn, George .....Derby
Farmer, Charles A. .....Putney
*Fisher, William F.....London
*Guyer, James Brett .....Southampton
Holroyde, William H. ...Bradford
Hands, William .....Cheltenham
*Harnett, Alfred ..... Kingston-on-Thames
*Heelas, Henry Martyn ...Southampton
*James, Alfred.....Carmarthen
Jones, Wm. Withers.....Welshpool
*Parrott, John Smyth.....Birmingham

Pidduck, John Wm. .....Bath
Pyne, Joseph John .....Stroud
Sharland, William H. ....Barnet
Shepherd, George P. .....Canterbury
*Smith, Joseph.....Birmingham
Smith, Richard .....Reigate
*Taylor, Richard .....Ryde
Tuck, Francis.....Trowbridge
*Vizer, Edwin Bennett ...Ledbury
*Walduck, Chas. Edward London
*Walsh, Edward .....Stockport
*Willey, Josiah.....Bristol
*Willmott, William.....Bristol
Williams, Thomas.....York
Woodcock, Joseph.....Leicester
Wrangham, John .....Bridlington
Youngman, Robert.....Bury St. Eds.

MINOR EXAMINATIONS.

*Alford Thomas .....London
*Anness, Samuel R. .....Hadleigh
*Chapple, Edwin .....Bideford
*Grundy, Thomas .....London
*Humphreys, Richard.....London
*Longhurst, Jas. Sidney...London
*Keeling, Thos. George ...Howden
*Penton, Charles Wm, ...Maidstone
*Sewell, William .....Sheffield

* Honorary Certificates.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS.
Allingham, George S.	Mr. Dakin	Poplar
Ambrose, John D. L.	Mr. Farmer	Putney
Aston, George	Mr. Grindley	Chester
Barber, Tom	Mr. King	Rochester
Beddard, John	Mr. Cross	Shrewsbury
Burdock, James	Mr. Reading	Warwick
Christian, John O	Mr. Brea	Douglas
Cook, William	Mr. Gamble	Grantham
Crussell, James Wm.	Mr. Cooper	London
Fresson, William	Mr. Fresson	Stevenage
Haslam, Frederick B.	Mr. Dakin	Poplar
Jacob, John Rosser	Messrs. Bowers	Chester
Johnson, Joseph	Mr. M'Dougall	London
Lawrence, George	Mr. Wright	London
Mulley, William	Mr. Chapman	Ipswich
Parsons, Francis Henry	Mr. Archer	Southam
Peacock, Joseph	Mr. Mease	South Shields
Peacock, Hamerton	Mr. Ball	Southwark
Potter, James Henry	Mr. Binnington	London
Rawling, John Wray	Mr. Oldham	Wisbeach
Reed, John G.	Mr. Thompson	Sunderland
Rod, George P.	Mr. Harrington	Rayleigh
Salmon, Henry L.	Mr. Moore	Brighton
Sarsfield, William	Mr. Leighton	Durham
Sayce, Benjamin	Mr. Grindley	Chester
Serpell, Samuel	Mr. Job	Truro
Smith, Frank de Carle	Mr. Wright	London
Steevens, Joseph G.	Mr. Martin	Guildford
Sturges, William T.	Mr. Gudgen	Kimbolton
Timms, William M.	Mr. Sutton	Smethwick
Todd, Edward	Mr. Carr	Berwick
Turner, John	Mr. Payne	Aylesbury
Walls, Thomas	Mr. Barber	Liverpool
Watson, William	Mr. Chapman	Ipswich
Wheeler, James	Mr. Payne	Aylesbury
Wiggins, John	Mr. Adkins	Northampton
Willett, Edmund	Mr. Shepherd	Brixton

PHARMACEUTICAL MEETING,

Wednesday, December 7th, 1853.

MR. DEANE, PRESIDENT, IN THE CHAIR.

The following donations to the Library and Museum were announced:—

Pereira's *Elements of Materia Medica and Therapeutics.* Vol. ii., part 2, from Mrs. Pereira.

Journal of the Society of Arts, from the Society.

Literary Gazette.

Medical Circular, from the Publishers.

Fruit of the Balsam of Peru plant, and seeds of Wrightia antidysenterica, from Mr. T. C. Archer, of Higher Tranmere, Cheshire.

Root of Bryonia Dioica, from Messrs. Bradley and Bourdas.

Tonkin Beans (*Dipterix odorata*), and two specimens of Rhubarb grown in Siberia from seeds obtained from Tartar merchants (see page 329), from Mr. A. Faber.

IRON ALUM.

The Curator, Mr. Greaves, drew the attention of the meeting to a specimen of *Iron Alum*, which had been sent by Mr. Lindsey Blyth, of St. Mary's Hospital, accompanied by a note, which was read. The object of Mr. Blyth's communication was, to describe the composition of the salt which has recently been prescribed by some of the medical officers attached to St. Mary's Hospital, under the name of *Iron Alum*, to explain the circumstances under which it was first brought under their notice, and the process which had been adopted at the hospital for making it. The salt first used at St. Mary's Hospital was part of a sample obtained by Mr. Davenport as a bye-product in the preparation of some ferruginous compounds. It was found by Dr. Tyler Smith to be a more powerful astringent than common alum, and not liable to produce the stimulating effects of other salts of iron. The salt obtained from Mr. Davenport consisted of sulphate of peroxide of iron and sulphate of ammonia, having the constitution and crystalline form of common alum. Some of the salt had been prepared by Messrs. Hopkin and Williams, and it had subsequently been made at the hospital, both with potash and ammonia. It was well known that the name *Alum* had for some time past been applied by Chemists, as a generic designation, to a long series of salts which coincided with common alum in constitution and form. Thus, common alum, which is usually viewed as a double salt, consisting of sulphate of alumina and sulphate of potash, being taken as the type, iron alum is formed by substituting peroxide of iron for the alumina. And as, in common alum, the potash may be replaced by ammonia or soda as well as by many other protoxides, so a similar replacement may be effected in iron alum without altering the type. Mr. Blyth directed the attention of those who had not particularly studied this subject, to a table representing the composition of some of the salts which have been described under the generic name of alum.

Series of Alums described by different Authors,

General formula ..... $M_2 O_3, 3 SO_3 + MO, SO_3 + 24$ Aq.

Common Alum.

With Potash ..... $Al_2 O_3, 3 SO_3 + KO, SO_3 + 24$ Aq.

" Soda ..... $Al_2 O_3, 3 SO_3 + NaO, SO_3 + 24$ Aq.

" Ammonia ..... $Al_2 O_3, 3 SO_3 + NH_4O, SO_3 + 24$ Aq.

" Magnesia ..... $Al_2 O_3, 3 SO_3 + Mg O, SO_3 + 24$ Aq.

" Lithia ..... $Al_2 O_3, 3 SO_3 + Li O, SO_3 + 24$ Aq.

" Manganese ..... $Al_2 O_3, 3 SO_3 + Mn O, SO_3 + 24$ Aq.

" Iron ..... $Al_2 O_3, 3 SO_3 + Fe O, SO_3 + 24$ Aq.

IRON ALUM.

With Potash .....$Fe_2 O_3$, 3 SO_3 + KO, SO_3 + 24 Aq.
" Soda .....$Ee_2 O_3$, 3 SO_3 + Na O, SO_3 + 24 Aq.
" Ammonia .....$Fe_2 O_3$, 3 SO_3 + NH_4O, SO_3 + 24 Aq.

CHROME ALUM.

With Potash .....$Cr_2 O_3$, 3 SO_3 + KO, SO_3 + 24 Aq.
" Soda .....$Cr_2 O_3$, 3 SO_3 + Na O, SO_3 + 24 Aq.
" Ammonia .....$Cr_2 O_3$, 3 SO_3 + NH_4 O, SO_3 + 24 Aq.

MANGANESE ALUM.

With Potash .....$Mn_2 O_3$, 3 SO_3, + KO, SO_3 + 24 Aq.
" Soda .....$Mn_2 O_3$, 3 SO_3 + Na O, SO_3 + 24 Aq.
" Ammonia.....$Mn_2 O_3$, 3 SO_3 + NH_4 O, SO_3 + 24 Aq.

It would be seen from this table that many of the salts to which the term *alum*, in its most comprehensive sense, was applied, and including the iron alum in question, contain no alumina. He had been principally induced to bring the subject under the notice of the meeting in consequence of some doubt and misapprehension having existed among Pharmaceutists to whom prescriptions ordering iron alum had been taken, as to the salt intended to be indicated by that term. As already stated, the salt now used at St. Mary's Hospital is the double sulphate of peroxide of iron and potash. It is prepared either by dissolving peroxide of iron in sulphuric acid, or by peroxidizing protosulphate of iron with nitric acid, and adding an equivalent of sulphate of potash. If the salt with ammonia be required, sulphate of ammonia is added instead of sulphate of potash. The solution, with excess of sulphuric acid, is to be evaporated until crystals are formed on cooling. Next to common alum and chrome alum, this is the one most easily formed of the whole series. It forms a beautiful salt, being of a pale violet colour. It is more soluble than common alum, the solution having a reddish colour. It may be distinguished from an alum containing protosulphate of iron, by the colour of the precipitate formed on the addition of caustic potash, which, with the salt under notice, will be brown, while with the other it will be green.

Mr. DAVENPORT stated that the preparation referred to in the note just read, under the name of Iron Alum, was obtained by him quite casually from a solution of persulphate of iron. It presented the octahedral form of common alum, and upon examination, was found to contain sulphate of ammonia and sulphate of peroxide of iron, but not a trace of alumina. This so-called iron alum was now introduced as a successful remedial agent, and would no doubt be classed among the Pharmaceutical preparations of the day. He thought the name Iron Alum an objectionable one to apply to this salt, and his object in making these remarks, was principally to suggest the adoption of a more distinctive appellation. It had been very properly shown by Mr. Blyth, not only that there are a great many alums, differing entirely in composition, but also that there are several iron alums. It was important that the substances used in medicine should be clearly defined, and he would therefore suggest that this salt when ordered in medicine should be called *Ammonio-sulphate of peroxide of iron*, when the ammonia salt was intended, or *Potassio-sulphate of peroxide of iron* if it were intended to indicate the potash salt.

A paper was then read on "The Preparations and Uses of the Chemicals employed in Photography," by J. B. EDWARDS, Ph. D.

A revised abstract of this paper will be found at page 322 of the present number.

The subject was amply illustrated by Photographs, showing the effect of different chemicals in the several popular processes; and the author expressed his obligations to Mr. Collins, of the Photographic Institution, New Bond Street, for the loan of a splendid series of proofs from collodion negatives, illustrating the progress of the Crystal Palace at Sydenham, by M. De la Motte;

and also several excellent portraits on paper, by Mr. Cundall and others, kindly lent for the evening; also to Mr. Samford, of Paternoster Row, for a series of fine negative and positive landscape views taken on paper; and to Mr. W. Baker, of Lord Street, Liverpool, for several remarkably large and excellent portraits and views on collodion upon glass. Besides these, were a number of portraits and microscopic pictures on collodion by the author.

PHYTOLOGICAL CLUB.

December 5th, 1853.

ROBERT BENTLEY, ESQ., F.L.S., A.K.C. &C., PRESIDENT, IN THE CHAIR.

A DONATION of some rare plants from Mr. Bentley was announced, and some specimens of *ergotised grasses* from Mr. Blyth.

The President called the attention of the Meeting to the Caudex of *Lastrea Filix-mas* (Presl.) found by Mr. Shillitoe in Jersey. It was growing in a boggy soil and shady position. The specimen was remarkable for its great size, being in a dried condition about fourteen inches in length, and about a foot in circumference, a size quite unusual in temperate latitudes. All the Ferns in the same locality were stated to be growing in the same luxuriant manner.

Mr. Blyth read the following paper

ON ERGOTISED GRASSES.

IN presenting the specimens of ergotised grasses to the Phytological Club, I beg to offer the results of my experience in collecting them, so that future observations may either confirm or refute any deductions that may be drawn from them. I met with no instance of the disease until the middle of the month of August, and then in shady rather than in moist places, and found very few indications of it (especially directing my attention to marshy and wet places) from the sandy soil of Norfolk through the clay of Middlesex, to the marls and limestones of the western counties. A month later the disease increased so as to become epidemic, first appearing in uncultivated grounds, and gradually spreading over the whole country, so that towards the end of September, there was scarcely a spot where the grasses were not more or less affected. I present eight different specimens of grasses so affected, but it appears to prevail most in the *Iolium* and *Dactylis*, so abundant was it in these species, that a plentiful supply might have been collected from the commons and hedgerows, but I could not induce any of the herb-gatherers to collect it for me, so that I have had no opportunity of examining its chemical properties. Many farmers are acquainted with the disease, and according to them, its presence in fields is evidence of bad farming. Liming the soil has been found to be the best remedy for the evil. That draining alone is of little value to get rid of it, may be inferred from its having been more abundant in the Regent's Park than elsewhere, and as if to defy such an enemy, it especially flourished on the ridges immediately over the draining pipes recently laid down in that soil.

Much has been said on the origin and cause of the ergot, but the question is still left in an unsatisfactory state. The opinion I am induced to adopt from observation is, that moisture has nothing to do with originating the disease, although it may promote its development, as filth and dirt combined with moisture may promote the extension of any pestilence. Let us look at the condition of the atmosphere at the time of year it is developed. In the fall of the year, decomposition and fermentation are going on at a rapid rate, and the germs of dissolution spread throughout the whole organised world. At the same time, the physical condition of the atmosphere is in a state peculiar to the season. Modern researches into the properties of light have proved that there are three distinct classes of rays—the actinic or chemical, the luminous, and the calorific rays; that the first prevail in the spring of the year and promote germination; the second prevail in the summer and promote the increase of the plant; and the third prevail in the autumn and promote the ripening of the fruit. Now we have in the fall of the year a diminution of the rays that sustain the vital energies of the plant, and render it less able to resist the attack of destroying forces. There are no doubt other conditions of the atmosphere not yet thoroughly examined or even thought of, which play an important part in the propagation or

suppression of disease. But the fact remains that it is in the fall of the year when fungoid diseases become most prevalent or epidemic.

It is only by the accumulation of observations that any law can be deduced. To obtain such, will be interesting, to enable the agriculturist to get rid of the disease from his fields, and permit it to be propagated with impunity, in waste places for its medical worth. It is with this object in view I have laid my recent observations before the Members of this Club, and hope at a future season to be more successful in collecting a sufficient quantity for examining its properties, and to obtain the co-operation of Members in different localities.

In connexion with the above subject Mr. Blyth also read the following communication from Mr. Cobb, of Yarmouth :—

Mr. Cobb thus writes, "The practice of underdraining has become so general amongst us as to have changed to some extent the character of our Flora. Several species of marsh plants, once plentiful and peculiar to this neighbourhood, have disappeared, whilst their loss has been supplied by the introduction of a large number of species commonly found in cultivated districts. Large tracts of wet marshes, which some years ago bore only a scanty crop of coarse grass and abundant *Cyperaceæ*, have been banked and drained, and now produce remunerating crops of corn. On the borders of such places the ergot was plentiful, especially on the *Lolium perenne and L. arvense;* I believe it is now found only in very wet seasons. As an example of the effect of this draining; I may state I have for the last three years been vainly endeavouring to meet with specimens of the *Vibrio tritici*, which a few years ago might be gathered in every field."

The above was written in July. In a recent letter to Mr. Blyth, Mr. Cobb states that the ergot had become very prevalent, and might be met with almost everywhere.

The President then announced that in future the meetings of the Club, in accordance with the wishes of the great majority of its Members, would take place on the second Wednesdays in the months in which they were appointed to take place, instead of the first Mondays as heretofore. The next meeting would therefore be held on Wednesday evening, January 11th, 1854.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

A Meeting of this Association was held in the Royal Institution on Friday evening, the 2nd December, Mr. Rawle, President, in the chair, when a paper (the first of a series) was contributed on

THE APPLICATION OF HISTOLOGY, OR THE SCIENCE OF TISSUES TO PHARMACY.

BY MR. HENRY SUGDEN EVANS.

Mr. Evans's object in bringing this subject under the notice of the Association was, to give the results of a series of investigations which had occupied him during the past summer, and to contribute something towards the advancement of the science of Pharmacy. He intended, however, confining himself to the examination of those remedial agents derived from the vegetable kingdom, as they constitute by far the largest and most important section of the Materia Medica; and he would select those substances for illustration which were of the most frequent occurrence or presented the most striking characteristics; always bearing in mind the important aid the microscope affords in the detection of adulterations.

The first medicinal substance taken for examination was *Rhubarb root*, it being one of the most important. On a former occasion Mr. Evans had read a paper before the Association on the Pharmaceutical History of Rhubarb, and had then shown how difficult it was by simply chemical means to distinguish the one variety from the other when in a highly comminuted state, or when the peculiar physical characters were otherwise distorted. He thought it would now be found that the microscope lends us valuable aid where chemical means proved almost valueless. When powdered or rasped rhubarb is examined under a magnifying power of from 300 to 400 diameters, a variety of structures are observed. In the first place empty cells

present themselves, frequently collapsed and in dense clusters, and chiefly abounding in the central portion of the root; others, apparently empty, are rounded or angular, with exceedingly thin walls. Somewhat similar to these, but smaller, are rounded and angular cells, filled, or partially so, with starch grains, amongst which occasional fragments of a pale yellow resinous matter are found. Others, again, similar in shape and size, are found entirely filled with this yellow resinous matter which is readily soluble in alcohol. Some very irregularly formed cells, with much thicker walls, abound, containing a dark reddish-brown matter of much less solubility than the paler resin. The starch grains contained in the cells are small, about $\frac{1}{3000}$ inch in diameter, and for the most part of a rounded form, with a central cruciate hilum, and, when treated with weak alcohol, concentric markings may be observed upon them. Numerous bundles of vascular tissue are also found composed of small and uniformly reticulated ducts with irrregularly pitted tissue, occasionally enclosing a spiral vessel. Besides these forms of tissue we also meet with peculiar platter-shaped vesicles. They are perfectly round bodies, of a more or less yellow colour, not acted upon by iodine, but, when treated with alcohol, disappear, leaving but a collapsed sac. They are, in all probability, the receptacles of an oleo-resinous volatile matter, to which the aroma of the root is due, and the existence of which Dr. Pereira considered essential, though, hitherto, no chemical means have succeeded in isolating it. The grittiness of rhubarb is due to the presence of raphides or crystals of oxalate of lime. They are found most abundantly in the central portion of the root, included in cells, and consist of large stellate groups of crystals. In Russian rhubarb they are more abundant and of more uniform figure than in either of the other varieties. The same kind of tissues is met with in each of the other varieties of rhubarb, but variously modified. These differences were illustrated by large drawings of their separate appearance under the microscope, from which it appeared that, although the same kinds of tissues were encountered in each of the commercial varieties, they were sufficiently modified to discriminate between them. Thus, the greater thickness of the cell membrane, the abundance of yellow resin in cells, the paucity of orange-coloured resin, and the occasional presence of epidermal cells, cubical in form, and having a dark reddish colour, are sufficient, with the bundles of coarse vascular tissue and groups of prismatic raphides, to distinguish the Chinese from the Russian. While the abundance of cellular tissue, both empty and filled, with large truncated starch grains, the almost entire absence of vascular bundles, the occasional fragments of large pitted tissue, and rarely occuring raphides, amply distinguish the European from either. The importance of these characters must be evident at a glance, as the main source of fraud is the admixture of the inferior quality of rhubarb with the superior; but this is equally culpable with that, in which a quantity of flour or other matters are added.

The next substances examined were the *Calumba root*, and the wood of *Coscinium fenestratum*, or false Calumba root. The main distinguishing characters being in the comparative absence of starch grains, and the greater length of those found in the wood, the presence of thick walled elongated woody cells, and of oval thick walled cells upon the epidermis, each cell enclosing a crystal of oxalate of lime.

Liquorice root next passed under examination, the chief features in which were :— the epidermis, consisting of four or five rows of flattened cells containing an acrid yellow resin, the woody fibre in bundles, and cells containing chlorophylle.

But of almost equal importance with rhubarb root, Mr. Evans classed that of cephaelis ipecacuanha, and, as tho *Lancet* Analytical Sanitary Commission had found that out of thirty-three samples of the powder examined, eighteen were more or less adulterated, it was evident some ready means should be in the hands of the Pharmaceutist for discovering the fraud. The necessity for a knowledge of the histologic forms met with in this root is more evident, since a spurious root, very much resembling in physical and chemical characters, the true root, but possessing only half its emetic properties, is likely to be largely imported into this country, and will doubtless be made use of as an adulteration of the genuine powder. On examining a tranverse section of the root, we observe first, an epidermis, consisting of compact irregularly angular cells with thick walls. The cells of the cortical layer immediately beneath the epidermis are large, with thin walls readily separated from one another, and the membrane tearing unevenly. They are filled with minute starch grains, truncated and rounded bodies, generally occurring in groups of two and three. The hilum is very conspicuous and central, with concentric rings. The

central portion of the root, or meditullium, consists of woody fibre, the cells of which terminate abruptly and squarely within one another, forming narrow tubes with thick pitted walls. They adhere very tenaceously to one another, the membrane tearing before the cells separate. Unlike woody tissue generally, these tubes are filled with starch grains. When seen in tangential section, the character of this tissue is very much altered, and an angular twisted appearance is given to the cells. Twisted bundles like these Mr. Evans had occasionally met with, having all the appearance of foreign woody matter, for which he had mistaken them, until, by actually observing them in the true root, he was convinced they appertained to it and resulted, in all probability, from contortions occasioned by decay. It occurred to him as probable, that much of the "extraneous woody fibre" discovered by the *Lancet* Commissioners, might be of the same nature. Minute acicular raphides frequently occur, grouped in threes and fours. The spurious root of a Richardsonia, stated by the *Lancet* Commissioners as unknown in English commerce, but which he had reason to believe would become an article of large consumption, differs from that of the Cephaelis Ipecacuanha, in the epidermal cells; which are larger, more angular, and elongated:—the cells of the cortical portion are also larger, the walls thicker, and the membrane firmer; the cells of the meditullium are larger and coarser, and the walls more deeply pitted, and instead of terminating squarely, they are conical, fitting into one another, and forming broad tubes.

The structure of the *sarsaparilla root* was examined, as illustrative of the roots of that curious class of plants (Dictiogens) forming the stepping stone from Endogens to Exogens.

Mr. Evans concluded his paper with an examination of *Black hellebore*, it being, as he said, a most appropriate illustration of the difference between roots, properly so called, and underground stems, which will form a topic in the next paper. The black hellebore root of commerce, consists of the true root, and the rhizome or underground stem. The structure of the former somewhat resembles ipecacuanha, having an epidermis, cortical layer, and a meditullium—consisting of alternate layers of pitted tissue with thick deeply pitted walls and plain woody tissue, except in the very centre, which consists of pitted tissue only. The rhizome, or underground stem of this plant, possesses no such structure; it consists almost entirely of small, thick walled, loosely adhering, rounded cells, destitute of starch grains, but containing abundance of oil globules, and brown colouring matter, with a few vascular bundles. The epidermis somewhat resembles that of the root, but has numerous oval, thick walled cells, similar to those on the epidermis of Columba wood. These cells are never found upon the epidermis of roots, though they are frequent upon underground stems, and, in fact, are found on all parts proceeding from the stem, their presence, therefore, is proof of the rhizome being of stem, and not root, origin.

The paper was fully illustrated by large magnified drawings of the structures described.

Mr. Mercer then brought before the meeting an article which was being offered for sale under the name of "Vegetable Acid," as a substitute for tartaric acid. On examination he had found it to be bisulphate of soda, which certainly might be used for the Gazogene Apparatus, in which merely an acid powder was required to decompose the carbonate of soda, but for no other purpose. He recommended the Members to bear it in mind in purchasing tartaric acid, as it might be used as an adulterant, though he was not aware that it had been. It was easily detected by applying the Pharmacopœia test.

December 9th, 1853.

THE PRESIDENT IN THE CHAIR.

Mr. J. B. Edwards delivered a lecture on "The Photographic Processes," an abstract of which is embodied in the paper at page 322 of this number. A large number of photographs were exhibited and much admired. Dr. Edwards expressed his thanks to Mr. Sanford for a series of proofs on paper presented to the Liverpool Photographic Society, to Mr. Collins for portraits on paper, and to Mr. Barker for large collodion positives kindly lent for the occasion.

Mr. Keith then exhibited some of his collodion portraits.

ORIGINAL AND EXTRACTED ARTICLES.

A BRIEF NOTICE OF A FEW ARTICLES IMPORTED INTO LIVERPOOL DURING 1853.

BY THOMAS CROXEN ARCHER, ESQ.

Many articles reach this country with so little information respecting their origin and uses that, upon their arrival, they are thrown aside by the broker as worthless, simply because he has no means of obtaining correct information as to their value. This is particularly the case with Liverpool, now the largest port in the world, but the most deficient in this kingdom of any scientific means for extending its commercial knowledge. The municipal authorities have opened a most magnificent collection of birds to the people, but they have not been able to see the utility of a commercial museum to a strictly commercial town. The Chamber of Commerce, another influential body, also labours under the same unfortunate apathy, and is unconscious of the vast amount of good which would inevitably follow the establishment of a commercial museum of reference. Under these circumstances many articles of value and importance escape the few inquiring minds, who would otherwise bring them into notice. To lessen this evil as much as lies in my power I propose from time to time, to transmit to the *Pharmaceutical Journal*, a description of such commercial materials connected with Pharmacy, with all the particulars I can collect concerning them. Several importations have occurred during the past year of Pharmaceutical articles of probable utility, amongst which were the following :—

A new Bark, imported under the name of Peruvian bark, from Valparaiso.—In respect to size and general appearance this bark is not unlike the coarser sticks of Cassia, for, though evidently the external bark of a tree, it is remarkably smooth and neatly rolled into thin quills, about two feet six inches in length ; the thickness of the bark about that of a shilling; the external colour is a very light drab, rather darker inside the quills, but internally the colour is cinnamon red. I heard that a sample was forwarded to London and returned as the bark of Stenostomum acutatum, a plant belonging to the *Rubiaceæ*, consequently nearly allied to the Cinchonas. I think this is clearly a mistake, because S. acutatum is a native of Guadaloupe, whereas the bark in question came from Valparaiso. It is most probably a species of Guettardia, perhaps G. cordata (Rubiaceæ, Jussieu ; Cinchonaceæ, Lindl.) the Guettardias are excellent febrifuges and tonics, for which qualities several of the species are in great repute amongst the native practitioners.

A spurious kind of Cassia fistula.—About two hundred weight of pods were imported into Liverpool and sold as Cassia fistula; they were of considerable size, some being as much as two feet in length and an inch and a half in diameter ; their colour is brownish black, like that of the true Cathartocarpus ; but the transverse section of this pod is oval instead of circular, and both sutures are strongly marked by the edges of each being much swollen, so as to give the appearance of a double edge of great thickness passing along each side of the pod. The smoothness of Cathartocarpus is also wanting, the valves being covered with rather deep cracks or wrinkles. The interior is divided as in Cassia fistula by transverse septæ, between each of which is an elliptical and horizontally compressed seed, surrounded by a sweet pulp. This pulp, though purgative, is by no means so aperient as that of C. fistula. This article is the Cathartocarpus grandis of Persoon's Enchiridium Botanicum, the Cassia mollis of Vahl and Jacquim, and Cassia Brasiliâna of Lamark. It is the horse Cassia of Mr. Redwood's Revision of Gray's *Supplement*. The horse Cassia, or great purging Cassia, is a native of various parts of South America and the Caribbee Islands. The lot in question was brought from New Granada and was probably collected

between Turbaca and Carthagena, one of its known localities. Although this lot was sold readily under the name of C. fistula it is quite worthless.

Neriumantidysentericum Seed.—Under this most formidable name, two or three consignments have been received in Liverpool, one only of which, I believe, met with a purchaser. It is the seed of Wrightia antidysenterica, or the Neriumantidysentericum (Nat. ord. Apocynaceæ) of Roxburgh: also mentioned by Mr. Redwood. The seeds at first sight resemble paddy or unhusked rice in size, colour, and shape; but a closer examination shows that they are concave on one side. They are intensely bitter, and as they look somewhat like oats, it is probable that they may be found in the mash-tubs of some of our bitter ale brewers. It will be less objectionable than its congener, nux vomica, which, notwithstanding the certificates of certain ale-bribed Chemists, is used for this scandalous sophistication. The plant is a native of Ceylon, and furnishes Conessi bark.

Balsam Seeds.—Under this name a small parcel of the peculiar pods of a species of Myrospermum (M. pubescens, De C., the White balsam) have been imported, and I believe are still on sale. The pods are from an inch to an inch and a half in length, containing one seed only at the end farthest from the stalk; the rest of the pod is flat, thin, and almost membranaceous, the whole being of a light colour like the ripe legume of a common pea. Between the seed and the pericarp there is a small quantity of balsam, with the odour of tolu, and the consistency of treacle. It comes from Carthagena, and is found in many of the forests of South America. On the Peruvian coast the Indians collect it to form the perfume called *quinquina*. It might be useful to lozenge-makers and perfumers, as spirit would no doubt dissolve the balsam.

Agar-Agar, or Ceylon Moss.—Under this name very large quantities of a yellow fucus have been imported and forwarded to the manufacturing districts where its gelatine is used in dressing silks and other textile fabrics. There appears to be some error about this article, for Pereira says Agar-Agar is Plocaria Candida, a white sea-weed, whereas the article imported under that name and as Ceylon moss, is Fucus spinosus. I have described it under the name of P. Candida in my "Economic Botany;" but a specimen which I have since forwarded to Kew is decided to be Fucus Spinosus. It is very different to Plocaria, for, instead of the long, thin, terete, white, and branched fronds of that genus, it is much thicker; the internodes shorter, and thickly set with short blunt spines, or rather conical projections; instead of the opaque white colour of Plocaria: it is yellow and semi-transparent, having an almost gelatinous appearance. I have seen it brought to this country as a preserve, made by soaking it until it becomes much swollen, and then candying it in syrup. So transparent is it then, that it cannot be distinguished from the syrup until it is taken out. I believe this to be the true Ceylon moss, which constitutes an important item in the Chinese commerce with India. Plocaria Candida may also be used, but must be of very much less value. I have forwarded specimens of this and the Wrightia and Balsam seeds to the Museum of the Pharmaceutical Society.

ON THE IMPROVED MANUFACTURE OF CITRIC AND TARTARIC ACIDS, ALONE, OR CONJOINTLY WITH THE MANUFACTURE OF BITARTRATE OF POTASH, TARTRATE OF SODA AND POTASH NITRATE OF POTASH, BINOXALATE OF POTASH, CARBONATE OF SODA, CARBONATE OF POTASH, AND CERTAIN CITRATES AND TARTRATES.

At page 397, vol. x. of the *Pharmaceutical Journal*, we gave the fullest account of the manufacture of tartaric acid, &c., which had up to that time appeared in print. Since that period various improvements have been suggested in the manufacture of

these articles, a notice of which at the present time will no doubt be acceptable to our readers.

Manufacture of Citric Acid, Citrate of Lime, Citrate of Baryta, &c.—In the ordinary method of manufacturing citric acid, lime-juice is saturated with chalk, and the insoluble citrate of lime, thus formed, is decomposed by sulphuric acid; citric acid is thus set at liberty. In this process the mucilaginous and other organic matters contained in the lime-juice, are to a great extent precipitated with the citrate of lime. These foreign matters, on the subsequent decomposition of the citrate of lime by sulphuric acid, contaminate the solution of citric acid obtained, and render it necessary for the manufacturer to have recourse to a great number of crystallizations, in order to procure the whole of the citric acid in a marketable state.

In order to destroy much of this mucilage and other organic matter, it has been recommended to bleach the washed citrate of lime by exposure in shallow vessels to the action of the sun's rays, covered by a weak solution of chloride of lime. In a few hours, it is stated, decolouration takes place, with the destruction of much of the foreign matter previously mixed with the citrate, and thus much of the after labour and expense of repeated crystallization is saved to the manufacturer.

Dr. Price's new process consists in combining the citric acid contained in lemon or lime-juice, or other impure solution of citric acid, with potash, soda, or ammonia, so as to obtain *soluble* citrates, and after separating any insoluble impurities which may be present, or which may arise in neutralization from the said neutral solution by filtration or decantation, he decomposes the said solution with salts of lime, baryta, or strontia, so as to obtain pure or nearly pure citrate of lime, or citrate of baryta, or citrates of strontia, and ammonia, or salts of ammonia, or salts of potash or of soda. The citrate of lime, or citrate of baryta or strontia, is decomposed by sulphuric acid in the usual manner, the citric acid crystallized, and the ammonia, or salts of ammonia, or salts of potash or of soda, contained in the solution from which the citrate of lime has been precipitated, may be recovered by crystallization or otherwise. The mode of procedure in carrying out this process is as follows:—Into crude lemon or lime-juice, or other solution containing citric acid, the volatile compounds contained in gas-liquor are distilled until the said juice or solution is neutralized, or the said juice or solution is neutralized with gas-liquor, or with ammonia or its carbonates, or with sulphides of ammonium, obtained as hereafter described; and the neutralized solution, being filtered from the insoluble impurities, the solution of citrate of ammonia thus obtained, is decomposed in the following manner:—The solution is placed in a distillatory apparatus, and to it there is added 150 parts by weight of carbonate of lime, powdered, and made into a paste with water, or 90 parts by weight of lime slacked, and made into milk of lime, to every 192 parts by weight of citric acid existing in solution as citrate of ammonia. Heat is then applied, and the said solution of citrate of ammonia is decomposed into citrate of lime and into carbonate of, or free, ammonia, which may be conducted into a fresh quantity of lemon or lime-juice, or other solution containing citric acid, so as to neutralize the same, which solution, when neutral, or better when alkaline, may be treated as last described. The citrate of lime, thus obtained, is to be decomposed with sulphuric acid, as is now done in the ordinary manufacture of citric acid, and the solution of the liberated citric acid filtered from the sulphate of lime, evaporated and crystallized. The solution of citrate of ammonia, obtained as first above described, may be treated with either chloride of calcium or sulphate of lime. For this purpose the solution of citrate of ammonia is boiled with either of the salts of lime, viz., chloride of calcium or sulphate of lime, until the citrate of ammonia, previously existing in solution, is decomposed, and citrate of lime and either sulphate of ammonia or chloride of ammonium obtained, the decomposition of the said citrate of ammonia being conducted in the same manner and with the same precautions as after described, with reference to improvements in the manufacture of tartaric acid.

The solution of citrate of ammonia, obtained as first above described, may be decomposed with sulphide or sulphides of calcium, or soda waste (oxysulphide of calcium), or sulphide of barium, or of strontium, the said solution being contained in a distillatory apparatus, and the decomposition being conducted in the manner before described.

The citric acid existing in lemon-juice or lime-juice, or other solution, may be combined with potash or soda instead of ammonia, and the resulting solution of

citrate of potash or soda be decomposed with either salts of lime or baryta, as follows:—The lemon or lime-juice, or solution containing citric acid, having been placed in a convenient vessel, a solution of sulphide or sulphides of potassium is added, with application of heat, until the whole of the citric acid is converted into citrate of potash, which may be known by the solution becoming neutral or slightly alkaline. The solution of citrate of potash thus obtained, being filtered from the insoluble impurities and placed in a suitable vessel, is decomposed by means of sulphate of lime or a solution of chloride of barium or chloride of calcium, or of nitrate of lime, or of nitrate of baryta, or chloride of strontium, or nitrate of strontia, in a manner similar to that at present adopted for decomposing tartrate of potash by means of sulphate of lime or chloride of calcium in the manufacture of tartaric acid. The citrate of lime thus produced, may be separated by decantation or filtration, and the solution containing the salts of potash, viz., either chloride of potassium, nitrate of potash, or sulphate of potash, evaporated in a convenient evaporating vessel. The salts of potash, thus obtained, if mixed with any impurities, may be recrystallized, so as to be rendered marketable.

In employing the salts of lime or baryta to decompose citrate of potash, citrate of soda or citrate of ammonia, solutions either saturated or partially so may be employed, or sulphate of lime in small crystals or powder may be used in the following proportions: viz., to every 192 parts by weight of citric acid, previously existing in lemon-juice or lime-juice, or contained in other solutions, and now existing as citrate of potash, citrate of soda, or citrate of ammonia, there may be added in parts by weight as follows:—246 parts of nitrate of lime, or 318 parts of nitrate of strontia, or 168 parts of chloride of calcium, or 240 parts of chloride of strontium, or 390 parts of nitrate of baryta, or 312 parts of chloride of barium, actually contained in solution or otherwise, or 258 parts of sulphate of lime.

Dr. Price also employs sulphide or sulphides of sodium to neutralize citric acid. This may be employed in a manner similar to that described for saturating citric acid with sulphide of potassium, and after having separated by decantation or by filtration the insoluble impurities, he decomposes the said solution of citrate of soda with sulphate of lime, in a manner similar to that described for decomposing citrate of potash with salts of lime, and with the same amount of sulphate of lime as there employed. The citrate of lime produced, is separated, and the sulphate of soda existing in solution may be obtained by evaporation and crystallization.

The salts of baryta, strontia, and lime, which are to be employed in decomposing citrate of potash, may be employed to decompose citrate of soda, and may be employed in a similar manner and in the same proportions as when employed to decompose solutions of citrate of potash. The citrate of lime and citrate of baryta or strontia resulting, may be decomposed by means of sulphuric acid in the same manner as citrate of lime is now decomposed in the manufacture of citric acid, and citric acid be therefrom obtained. The sulphide of potassium and the sulphide of sodium employed, may be obtained by heating a mixture of either sulphate of potash or sulphate of soda with small coal, coal-dust, or powdered charcoal, in a reverberatory furnace, or otherwise, until the whole or the greater proportion of the sulphate of potash or sulphate of soda is reduced and converted into sulphide of potassium and sulphide of sodium. These sulphides being soluble in water, they may either be employed in solution, or the fused mass may be used direct, or these sulphides may be obtained from other sources.

Manufacture of Tartaric Acid, Purified Bitartrate of Potash, Binoxalate of Potash, Tartrate of Soda and Potash, and Carbonates of Soda and Potash.—In the ordinary mode of obtaining tartaric acid, the excess of acid, existing in crude bitartrate of potash (argols and tartar) is neutralized with chalk, with the formation of insoluble tartrate of lime and soluble tartrate of potash. The latter salt is then decomposed by the agency of sulphate of lime, and a further portion of tartrate of lime is thus formed. In this case, as in that of the citrate of lime before mentioned, much of the organic colouring matters present are precipitated with the tartrate of lime, and on the subsequent decomposition of this salt by means of sulphuric acid, the tartaric acid set free is contaminated by the presence of these foreign matters, and the manufacturer is obliged, as in the case of citric acid, to resort to several crystallizations in order to obtain the whole of the acid in a state fit for the market.

Dr. Price's improvements in the manufacture of tartaric acid consist in combining bitartrate of potash with ammonia, so as to form tartrate of ammonia and potash, which may be effected, either by neutralizing impure bitartrate of potash or crude argol or crude tartar with gas-liquor, or with a solution of ammonia, or with carbonate of ammonia, or sulphides of ammonium, obtained by decomposing tartrate or citrate of ammonia with hydrated caustic lime or carbonate of lime, or sulphides of calcium, or sulphides of barium or strontium, or with condensed volatile salts of ammonia obtained by distilling gas-liquor or ammoniacal liquors. Impure bitartrate of potash being placed, with or without water, in a suitable and convenient vessel, a solution of ammonia or of salts of ammonia is added until the whole of the bitartrate of potash existing in the crude tartar or argol is neutralized, and a solution obtained of tartrate of potash and ammonia, which solution is to be separated by filtration or decantation from any insoluble impurities. The solution of tartrate of potash and ammonia, thus obtained, may be treated by either of the following processes:—To the tartrate of potash and ammonia a solution of chloride of calcium is added, until the whole of the tartrate of potash and ammonia is decomposed; that is to say, that for every 188 parts of bitartrate of potash existing in the crude argol or tartar, and now existing in solution as tartrate of potash and ammonia, a solution of chloride of calcium, corresponding to 112 parts of chloride of calcium, are to be added, with application of heat to the mixed solutions. The solution of chloride of potassium and ammonium is separated from the tartrate of lime produced, by decantation or filtration, and the solution containing chloride of potassium and chloride of ammonium is to be evaporated, care being taken that the solution be kept alkaline or neutral by the addition of either of the above mentioned ammoniacal salts or ammonia. The tartrate of lime deposited, during the evaporation is to be separated, and the chlorides of potassium and ammonium in the solution separated by evaporation and crystallization. The mother-liquors, containing chlorides of ammonium and potassium, together with tartrate of lime, are to be evaporated, and the tartrate of lime which deposits separated, or the mother-liquors may be evaporated to dryness, and the chlorides of potassium and ammonium be dissolved in water and filtered. The tartrate of lime left, together with that previously separated, is to be collected, and may be decomposed in the usual manner with sulphuric acid, and tartaric acid be obtained therefrom. The chloride of ammonium and chloride of potassium in the solution may be evaporated down and crystallized either together or separately.

Or, instead of the above process, the tartrate of ammonia and potash may be decomposed by boiling a solution of the same with sulphate of lime until the whole of the tartrate of potash and ammonia is decomposed into tartrate of lime and sulphate of potash and sulphate of ammonia. These may be separated in a manner similar to that described for effecting the separation of chloride of potassium and chloride of ammonium from tartrate of lime. The tartrate of lime obtained, after separating the sulphate of potash and sulphate of ammonia, may be decomposed in the usual manner by means of sulphuric acid, and after separation from the resulting sulphate of lime, and by evaporation and crystallization, the tartaric acid is fit for use.

Or, tartrate of potash and ammonia may be decomposed by treating a solution of the same, contained in any suitable distillatory apparatus, with carbonate of lime or hydrated caustic lime, and in the proportion of 60 parts by weight of carbonate of lime, ground, and made into a paste with water, or 30 parts by weight of lime slacked, and made into milk of lime, or with 36 parts of sulphide of calcium, or 36 parts by weight of soda waste, "oxysulphide of calcium," or 85 parts by weight of sulphide of barium, or 60 parts by weight of sulphide of strontium, for every 188 parts of bitartrate of potash previously existing in the crude argol or crude tartar, and now contained in solution as tartrate of potash and ammonia. Heat is to be applied, and the volatile ammoniacal products which distil off are to be collected, and may be employed for dissolving and neutralizing an additional quantity of impure bitartrate of potash contained in crude argol or crude tartar. After having distilled off the ammonia or volatile ammoniacal salts, the tartrate of lime, or tartrate of baryta, or tartrate of strontia formed, is to be separated, and the solution containing tartrate of potash may be decomposed with nitrate of soda, as hereafter mentioned, or may be decomposed with either sulphate of lime, or chloride of calcium, or nitrate of lime, or chloride of barium, or nitrate of baryta, or nitrate of

strontia, as to be after mentioned. The decomposition is to be effected in the same manner as tartrate of potash is now decomposed in the manufacture of tartaric acid by sulphate of lime and chloride of calcium. The tartrate of lime, or tartrate of baryta, or tartrate of strontia thus obtained, is separated from the salts of potash produced, and may be decomposed with sulphuric acid, as is now done in the manufacture of tartaric acid from tartrate of lime, and the solution, containing the potash salts, either sulphate or nitrate of potash, or chloride of potassium, be evaporated and crystallized. The apparatus and vessels now employed in manufacturing citric or tartaric acids, or in manufacturing sulphate of ammonia and ammonia, also employed in saltpetre refineries, are applicable to the processes described.

Dr. Price's further improvements in the manufacture of tartaric acid consists in combining bitartrate of potash existing in crude argols, crude tartar, and impure bitartrate of potash, with potash or soda, and in decomposing the tartrate of potash and tartrate of potash and soda with salts of lime, baryta, or strontia.

Having placed impure bitartrate of potash in a suitable vessel, it is first neutralized with a solution of sulphide of potassium or sulphides of potassium, and after separating the insoluble impurities, the solution is placed in a convenient vessel and decomposed with either sulphate of lime or chloride of calcium, or chloride of barium, or nitrate of baryta, or nitrate of lime, or nitrate of strontia, in a similar manner and in similar apparatus to that in which tartrate of potash is now decomposed with sulphate of lime or chloride of calcium. With the exception of sulphate of lime, the baryta, strontia, and lime salts may be added in solution or otherwise in about the following proportions, by weight, viz., 208 parts of chloride of barium, or 160 parts of chloride of strontium, or 112 parts of chloride of calcium, or 166 parts of nitrate of lime, or 212 parts of nitrate of strontia, or 260 parts of nitrate of baryta, or 172 parts of sulphate of lime, to every 188 parts by weight of bitartrate of potash previously existing in the crude argol, crude tartar, or impure bitartrate of potash, and now existing as tartrate of potash in solution. The solution of the salts of potash thus obtained, being separated by decantation from the tartrate of lime and tartrate of baryta, may be evaporated and crystallized. The impure salts of potash may be purified by re-crystallization, and the tartrate of lime, or tartrate of baryta, or tartrate of strontia, after having been washed with water, may be decomposed with sulphuric acid in the same manner as tartrate of lime is now decomposed, and tartaric acid be therefrom obtained by crystallization. Impure bitartrate of potash, crude argol, or crude tartar, is to be neutralized by means of sulphides of sodium, as after mentioned, and tartrate of potash and soda thereby obtained, which said solution, after being separated from the insoluble impurities, may be evaporated and crystallized. Having obtained a solution of tartrate of potash and soda, by dissolving the said salt in water, the said solution is to be decomposed by means of chloride of calcium, in the proportion of 112 parts by weight of chloride of calcium to every 300 parts by weight of tartrate of potash and soda employed. The decomposition of the mixed solutions may be effected, by treating the same contained in a suitable vessel, the resulting tartrate of lime being allowed to settle. The supernatant solution containing chloride of sodium and chloride of potassium is to be withdrawn, and by evaporation and crystallization chloride of potassium and chloride of sodium obtained. Or a solution of tartrate of potash and soda may be decomposed in a similar manner, by heating the same with sulphate of lime, in the proportion of 172 parts by weight to every 300 parts by weight of tartrate of soda and potash employed. After separating the tartrate of lime formed, the solution containing sulphate of potash and sulphate of soda is to be evaporated, and these salts either obtained together, or they may be separated by re-crystallization. In order to separate certain soluble impurities, such as colouring matters, existing in the solutions of citrates or tartrates of ammonia, potash, or soda, their solutions may be filtered through filters or cisterns containing animal charcoal, or animal charcoal may be mixed with their solutions, and be separated together with certain impurities by filtration.

As bitartrate of potash of commerce usually contains a certain amount of tartrate of lime, the said tartrate of lime will remain with the impurities after the before mentioned treatment of the said bitartrate of potash, and in order to utilize the same, the residuum is to be treated with sulphuric acid in the same manner, but in proportion to the amount of tartrate of lime present, as the tartrate of lime, mixed

with impurities from impure bitartrate of potash, argols or tartars, is now decomposed, and the tartaric acid therefrom obtained.

Mr. Firmin's combined processes of obtaining tartrate of lime for the manufacture of tartaric acid, purified cream of tartar, and binoxalate of potash, are practically carried out in the following way:—Into a vessel such as is used in the manufacture of tartaric acid, a quantity of impure bitartrate of potash (argol or tartar) and water is placed, together with as much carbonate of lime as will suffice to neutralize the excess of acid existing in the bitartrate. By this means neutral tartrate of potash is formed, which remains in solution, and tartrate of lime, which precipitates to the bottom of the vessel. The solution of tartrate of potash is decanted from the tartrate of lime, digested on animal charcoal, and filtered. To such a quantity of this filtered colourless solution, as is found by analysis to contain 100 parts of tartrate of potash, 60 parts of crystallized oxalic acid (dissolved in water), or as much as will serve to decompose one-half of the tartrate of potash contained in the solution, are then added. By this means, a neutral solution of oxalate of potash is formed, remaining in solution, whilst the tartaric acid liberated unites with the other half of the tartrate of potash, forming pure bitartrate of potash, which precipitates to the bottom of the vessel.

In the ordinary process of manufacturing tartaric acid, in which a solution of tartrate of potash is decomposed by means of sulphate of lime, a quantity of solution of sulphate of potash is obtained. Mr. Firmin applies this solution of sulphate of potash, when purified and filtered, to the manufacture of binoxalate of potash, by adding to as much of this solution at 180° F. as is found by analysis to contain 100 parts of sulphate of potash, a solution of 100 parts of crystallized oxalic acid, or a sufficient quantity to effect the decomposition of the sulphate of potash. The solution thus obtained yields crystals of binoxalate of potash on evaporation. The residuary mother-liquor is dilute sulphuric acid.

In these cases the advantage sought to be obtained is, the use of a salt in the manufacture of binoxalate of potash, yielding that alkali at a more economical rate than carbonate of potash (pearlash), which has hitherto been employed for this purpose. "Suppose, for instance," says Mr. Firmin, "100lbs. of cream of tartar to contain 25lbs. of potash, this I do not value at more than 2*s*., after deducting the loss of quantity owing to the difficult solubility of the sulphate (into which it is converted), and the cost of evaporation, which, owing to the same cause, is very great, while it would require 50lbs. of pearlash, at a cost of 12*s*. 6*d*., to produce the same quantity, independently of the gain upon the purification of the cream of tartar precipitated. Or 100lbs. of sulphate of potash, of 80 per cent., at 8*s*. per cwt., will yield, independently of sulphuric acid, 44lbs. of potash, against 88lbs. of pearlash, costing 22*s*."

Dr. Price's improvements in obtaining and refining bitartrate of potash consist in rendering the bitartrate of potash, contained in crude argol and crude tartar, more soluble, by combining the said bitartrate of potash with potash, soda, or ammonia, and obtaining soluble double and neutral tartrates (tartrate of potash and soda, tartrate of potash and ammonia, or tartrate of potash) which said tartrates, being separated from the insoluble impurities contained in the said impure bitartrate of potash, are decomposed by means of acids or acid salts, as after mentioned, and purified bitartrate of potash is obtained more economically and expeditiously than by the methods now generally employed. To effect this the following process is adopted :—Crude argol, or crude tartar, or impure bitartrate of potash, is placed in a closed vessel, with one or more exit pipes, capable of allowing any gas that may be generated to escape, or to be conducted away, and into such vessel is run a solution of sulphide or sulphides of sodium, sufficient to neutralize the bitartrate of potash. The vessel is so arranged, that artificial heat may be applied by steam or otherwise, or that a jet of steam may be admitted: the bitartrate of potash decomposes the sulphide or sulphides of sodium, forming a tartrate of potash and soda, and sulphuretted hydrogen is liberated, which escapes by the exit tubes. The resulting solution of tartrate of potash and soda, being separated either by decantation or filtration from the insoluble impurities contained in the crude argol, crude tartar or impure bitartrate of potash, is concentrated in a suitable evaporating vessel to about sp. gr. 1.425 at 212° F., and allowed to cool to 60° F.; the crystals obtained are separated from the mother-liquors, and these liquors are again concentrated to sp. gr. 1.425 at

212° F. and allowed to crystallize; the mother-liquors left after this crystallization, if they contain much foreign matter, may be boiled with animal charcoal, filtered, evaporated, and set aside to crystallize. The remaining mother-liquors may be similarly treated, or mixed with liquors resulting from subsequent operations. The crystals of tartrate of potash and soda thus obtained, if they be not sufficiently pure, are to be dissolved in water and re-crystallized. Having obtained tartrate of potash and soda of the desired purity, the crystals are dissolved either in hot or cold water, and a saturated or partially saturated solution obtained; into this solution sulphurous acid is to be passed, which unites with the soda, forming soluble sulphite and sulphites of soda, and bitartrate of potash is precipitated. Sulphurous acid is to be added until the double tartrate of potash and soda is decomposed (which may be known when no further precipitation of bitartrate of potash occurs on the addition of a small quantity of an acid stronger than tartaric to a portion of the solution); the deposited bitartrate of potash is allowed to settle, and the solution is drawn off, and entirely or partially re-saturated with tartrate of potash and soda. Sulphurous acid is again passed into the solution, and the former operations repeated, the supernatant solution may then be separated, and will contain sulphites of soda and bitartrate of potash. The solution may be neutralized with sulphide of sodium or carbonate of soda and concentrated, when tartrate of potash and soda, sulphite of soda, and (if sulphide of sodium has been employed) hyposulphite of soda, will crystallize out. These salts may be separated by crystallization, and the tartrate of potash and soda may be decomposed with sulphurous acid as beforementioned. The bitartrate of potash, thus obtained, is to be washed with cold water, until the whole of the sulphites of soda are removed, and then dried, when it will be ready for use.

The resulting sulphite or sulphites of soda and hyposulphite of soda, which are obtained in this operation, may be dried and fused with small coal or charcoal, and converted into sulphide of sodium. Or the sulphite or sulphites of soda and the hyposulphite of soda may be decomposed in a suitable vessel by sulphuric acid, and the sulphurous acid liberated be collected and employed for precipitating bitartrate of potash from tartrate of potash and soda.

A solution of tartrate of potash and soda, obtained as before described, by neutralizing bitartrate of potash with sulphide of sodium, or from any other source, may be decomposed with bisulphate of potash or bisulphate of soda, or acid sulphates of potash, or acid sulphates of soda, added in the proportion of 300 parts by weight of tartrate of potash and soda (in crystals) dissolved in water, to every 40 parts by weight of sulphuric acid not in combination as neutral sulphate of potash or soda; that is to say—in employing bisulphate of potash, 300 parts by weight of tartrate of potash and soda are to be used for every 137 parts by weight of bisulphate of potash, and 300 parts by weight of tartrate of potash and soda are to be employed for every 121 parts by weight of bisulphate of soda (solid).

Having dissolved, in any suitable vessel, the acid sulphates of soda, a solution of the tartrate of potash and soda, obtained as before mentioned, is to be added, and after being well agitated, the precipitated bitartrate of potash is allowed to settle. The supernatant solution is then to be separated, and saturated either with sulphide of sodium or carbonate of soda, and evaporated, in order that the sulphate of soda may be separated by crystallization from the tartrate of soda and potash existing in the said solution. The tartrate of potash and soda thus obtained from the supernatant liquor, is to be decomposed with a solution containing an equivalent proportion of acid sulphate of soda, and the deposited bitartrate of potash separated.

If acid sulphate of potash be employed to decompose the tartrate of potash and soda, the supernatant solution, having been separated from the precipitated bitartrate of potash, and having been neutralized with sulphide of sodium, or sulphide of potassium, or carbonate of soda, or carbonate of potash, is to be evaporated, and the sulphate of potash and sulphate of soda separated from the tartrate of potash and soda by crystallization. The tartrate of potash and soda may be decomposed in a similar manner by means of acid sulphates of soda, and after separating the deposited bitartrate of potash, the supernatant solution may be neutralized with sulphides of sodium or carbonate of soda, and by crystallizing the resulting sulphite of soda and hyposulphite of soda, obtained by evaporation and crystallization, they may be decomposed by adding an equivalent of sulphuric acid to a solution, or to

crystals of sulphite of soda or hyposulphite of soda contained in a suitable vessel, and the free sulphurous acid liberated, collected and employed for decomposing tartrate of potash and soda as before mentioned.

Dr. Price's further improvements in the manufacture of bitartrate of potash, relate to the decomposition of tartrate of ammonia and potash by means of acids and acid salts, so as to obtain purified bitartrate of potash, which is effected as follows: Having obtained a solution of tartrate of potash and ammonia in the manner before described, and the said tartrate of potash and ammonia having been placed in a suitable vessel, sulphurous acid is passed into the same, until no further precipitation of bitartrate of potash is occasioned on the addition to the solution of a small quantity of an acid stronger than tartaric acid. The deposited bitartrate of potash being separated, the solution, containing sulphite of ammonia and bitartrate of potash may be decomposed in a suitable vessel, by means of sulphuric or hydrochloric acid, so as to obtain sulphurous acid, which may be employed for effecting the decomposition of a subsequent quantity of a solution of tartrate of potash and ammonia. The resulting sulphate of ammonia or chloride of ammonium, containing in solution a certain amount of bitartrate of potash, is to be neutralized with any of the before mentioned volatile alkaline ammoniacal salts, and evaporated; and the sulphate of ammonia or chloride of ammonium obtained by crystallization. The mother-liquors containing tartrate of potash and ammonium are to be acidified with sulphurous acid, in order to obtain bitartrate of potash. The resulting solution is then neutralized with ammonia, and evaporated as before mentioned, care being taken, in both instances, that the solution be kept slightly alkaline by means of ammonia or alkaline ammoniacal salts during and after concentration.

The tartrate of potash and ammonia may be decomposed, and purified bitartrate of potash obtained, by decomposing the said tartrate of potash and ammonia with bisulphate of potash or bisulphate of soda, or acid sulphate of potash or soda in the same manner, and in the same proportions, as described under the process for decomposing tartrate of potash and soda with acid sulphate of soda and acid sulphate of potash, for every 188 parts by weight of bitartrate of potash originally contained in the impure bitartrate of potash. If bisulphate of potash is employed, bitartrate of potash is precipitated, and sulphate of potash and sulphate of ammonia remain in solution with a certain amount of bitartrate of potash. The solution is kept neutral or alkaline by the addition of ammonia or the volatile alkaline salts thereof as before mentioned, and when evaporated to a sp. gr. of about 1.350 at 212° F. a solution of bisulphate of potash or sulphuric acid may be added, in sufficient quantity to neutralize the ammonia existing in excess, and also that which is combined as tartrate of potash and ammonia. The resulting bitartrate of potash which precipitates is separated, and the solution neutralized with ammonia, or potash, or their carbonates, or sulphides of the same, and evaporated, in order to obtain by crystallization the sulphate of potash and sulphate of ammonia. The tartrate of potash and ammonia existing in the mother-liquors may be decomposed as before mentioned.

Or, sulphuric or hydrochloric acid may be employed to decompose the tartrate of potash and ammonia obtained by neutralizing impure bitartrate of potash by means of gas-liquor, ammonia, carbonate of ammonia or sulphides of ammonia, obtained by decomposing citrates or tartrates of ammonia, by means of hydrated caustic lime, carbonate of lime, or sulphides of calcium, sulphides of barium or sulphides of strontium, in the proportion of 50 parts of monohydrated sulphuric acid, and 37 parts of actual hydrochloric acid contained in any dilute acid solution, to every 188 parts of bitartrate of potash existing in the crude argol or crude tartar, and now existing in solution as tartrate of potash and ammonia; after separating the precipitated bitartrate of potash, the resulting solution, containing the sulphate or muriate of ammonia, may be separated by crystallization. The tartrate of potash and ammonia remaining in the solution, is to be decomposed with an equivalent proportion of either sulphuric or hydrochloric acid.

Tartrate of potash having been obtained, either by neutralizing bitartrate of potash with sulphide of potassium, or neutralizing bitartrate of potash with carbonate of lime or lime, the solution of tartrate of potash having been placed in any suitable vessel, sulphurous acid is passed into it, until no further precipitation is effected, by the addition of a small quantity of an acid stronger than tartaric acid

to the solution. The precipitated bitartrate of potash is separated, and washed with cold water. The decanted or filtered solution is neutralized with sulphide of potassium, and concentrated to about sp. gr. 2.000 at 212 F., the tartrate of potash existing in solution is decomposed by sulphurous acid, the resulting bitartrate of potash is separated as before-mentioned, and the mother-liquors, being separated from the precipitated bitartrate of potash, after having been neutralized with sulphide or sulphides of potassium, are concentrated, and the sulphite and hyposulphite of potash are separated from the tartrate of potash by crystallization or the sulphite and hyposulphite of potash thus obtained, may be re-converted into sulphide of potassium, by heating the dried salts with small coal, in a reverberatory or suitable furnace, and the sulphide of potassium resulting, may again be employed for neutralizing and dissolving impure bitartrate of potash, or the sulphides or hyposulphite of potash may be decomposed with a stronger acid, and the liberated sulphurous acid be employed for a subsequent operation.

Another improvement of Dr. Price's in the manufacture of purified bitartrate of potash consists in that tartrate of potash and soda (obtained by neutralizing impure bitartrate of potash by sulphide of sodium, or obtained by decomposing tartrate of potash and ammonia, or tartrate of potash by means of nitrate of soda or sulphate of soda, or chloride of sodium, so as to obtain nitrate of potash or sulphate of potash, or chloride of potassium and tartrate of potash and soda before described) is to be decomposed by sulphuric acid or hydrochloric acid, in the proportion by weight of 50 parts of monohydrated sulphuric acid contained in solution in water, or 37 parts by weight of actual hydrochloric acid contained in solution in water, to every 300 parts by weight of tartrate of potash and soda employed. Tartrate of soda and potash obtained as above mentioned, being dissolved in either warm or cold water, and placed in a convenient vessel, sulphuric or hydrochloric acid is added in the proportions above mentioned. The bitartrate of potash, which is precipitated, is allowed to settle, and the supernatant solution is decanted or filtered from the deposited bitartrate of potash. The solution separated is neutralized with sulphide or sulphides of sodium, and concentrated by evaporation, when sulphuric or hydrochloric acids are to be added to decompose the tartrate of potash and soda existing in the concentrated solution, and they are to be added until no further precipitate of bitartrate of potash is occasioned by the addition of the same to the said solution. The said solution, being separated from the precipitated bitartrate of potash, and neutralized by means of sulphides of sodium as before mentioned, is to be evaporated, in order that the salts of soda (sulphate of soda or chloride of sodium) may be separated by means of crystallization. The mother-liquor remaining will contain a small quantity of tartrate of potash and soda, which may be decomposed by means of sulphuric or hydrochloric acid as before mentioned, or may be mixed with mother-liquors resulting from a subsequent operation.

Mr. Gatty's process for obtaining tartrate of lime to be used for the manufacture of tartaric acid, conjointly with carbonate of soda or potash, consists in decomposing solutions of the neutral tartrate of potash and neutral tartrate of soda by means of carbonic acid gas or carbonate of lime, and is performed in the following manner:—Into a cylindrical wooden vessel, of the capacity of about 400 gallons, 300 gallons of solution of neutral tartrate of potash, marking 5° of Twaddell's hydrometer, are introduced through an opening in the top of the vessel. 34 gallons of milk of lime, each gallon containing one pound of lime, are then added, and the opening closed by means of an air-tight cover. Carbonate of lime, or a mixture of carbonate of lime and lime, may be employed instead of lime only. An agitator, passing through an air and steam-tight stuffing box in the top of the vessel, is then set in motion, and a current of carbonic acid gas passed into the mixture until its complete saturation is effected. The result is, that bicarbonate of potash and tartrate of lime are formed, the former of which remains in solution, whilst the latter is precipitated to the bottom of the vessel. The clear solution of bicarbonate of potash is now run off, and the tartrate of lime well washed, to remove all the potash salt; the first washings being mixed with the stronger solution, and the latter reserved to be used for the first washing waters of another operation. The tartrate of lime thus produced may be employed in the manufacture of tartaric acid. The solutions of bicarbonate of potash are next evaporated to dryness in an iron pan, by which means the bicarbonate is changed into sub-carbonate, which may be calcined

in a reverberatory furnace, when a carbonate of potash will be produced, sufficiently pure for most manufacturing purposes. If required of greater purity, it may be purified in the usual manner. The carbonic acid gas may be produced in any known manner. The same process is applicable to the manufacture of carbonate of soda, substituting neutral tartrate of soda for the neutral tartrate of potash above-mentioned.

(*To be continued.*)

ON PHOTOGRAPHY.

BY J. B. EDWARDS, PH.D., F.C.S.

[The present paper is an embodied abstract of the papers on "The Preparations and Uses of the Chemicals used in Photography," and on "The Photographic Processes" read in London and Liverpool during the past month, as noticed elsewhere.]

But fifty years ago, Mr. Wedgwood first communicated to the Royal Society a new method of copying paintings on glass, this consisted of laying the glass upon white paper, first saturated with nitrate of silver and exposing them together to the sun's rays. The paper became blackened in proportion to the transparency of the glass above, and thus a copy of the original was produced, in which the lights and shades were reversed. Here his labours ceased, and Sir Humphry Davy, in repeating his experiments, added little to them beyond an extension of the class of objects suitable for the process, among which were microscopic objects; and for some years these delicate pictures, which could only be viewed by candle-light, and even then were evanescent and imperfect, constituted the sole wonders of "Photography."

In 1814 M. Niépce, of Chalons, applied the camera obscura to the production of pictures from natural images, and employed bitumen and essential oils on plates of glass or silver: he continued his experiments, in conjunction subsequently with M. Daguerre, until the process now known as the Daguerreotype was perfected, in which iodide of silver is the substance reduced by light.

About 1839, Sir John Herschell, Mr. Fox Talbot, and others, paid great attention to the production of images on paper, and by the aid of the camera and more sensitive solutions, the process of Wedgwood and Davy was amplified and improved, and by the use of *salt* the impressions were made more permanent. These labours resulted in the beautiful process called the "Calotype," patented by Mr. Talbot in 1841, since simplified and improved, and now in the liberal spirit which should at all times actuate men of science, presented to the public (with a reservation only on professional artists).

Many industrious labourers have since extended the subject, and Mr. Robert Hunt has contributed many ingenious processes to those already known.

That which, however, promises to surpass all others in its general application and perfection of result, is the collodion or albumen process, applied to glass, and called the Verreotype. This was first suggested in France; but the employment of collodion is due to the experiments of Mr. Archer, and the dauntless perseverance of Mr. P. Fry. In its application to portraiture, as well as to the microscope and telescope, and to wood engraving, it has advantages possessed by no other process.

Having thus sketched very briefly the gradual but rapid progress of the art, I will as shortly as possible describe the most interesting or curious of the many processes now followed:—

The Anthotype.—The colouring matter of red poppies, violets, and some other flower petals, undergoes remarkable changes when exposed to light. When paper is saturated with an infusion of these vegetables, and some semi-transparent objects superimposed, when placed in the sun the colour is discharged from the transparent or exposed portions, and an image of the object obtained,

showing that the permanence in colour of these juices in the plant is due to the principle of vitality within it.

The Chromatype consists of the employment of bichromate of potassa, and a salt of copper or cadmium; paper is saturated with these solutions, then exposed to the light, and next washed with solution of nitrate of silver; chromate of silver with dichromate of copper is reduced, forming the dark shadows of the picture.

The Cyanotype consists of saturating paper with sesqui-ferro-cyanide of potassium, and exposing it to light. Prussian blue is reduced upon those portions acted on by the light, and the other salts are removed by washing with sulphate of soda or ammonia.

The Crysotype pictures are produced by exposing paper saturated with ammonio-citrate of iron to the light, then developed with neutral solution of chloride of gold, fixed with sulphuric acid, bromide of potassium, and water.

The Ferrotype depends on the reduction of salts of iron. Paper saturated with succinic acid and chloride of sodium, and a protosalt of iron with nitrate of silver, is submitted to light, the image developed with sulphate of iron, and fixed with ammonia. Similar results have been obtained from the syrup of iodide of iron with salts of silver.

The *Fluorotype* is a similar process, in which fluoride of sodium is used with bromide of potassium in the first preparation of the paper, then the nitrate of silver. The picture is developed with sulphate of iron, and fixed with hyposulphite of soda.

The *Thermotype* illustrates the fact that when any body is placed in close contact with a metallic surface, its image is impressed upon it, although not obviously, unless subjected to some further change of condition. When any object is pressed on a surface of metallic copper, on exposing the latter to the vapour of mercury, an image appears, and when the copper is first amalgamated with mercury, then placed in contact, and lastly exposed to vapour of mercury and iodine, the image is a powerful and tolerably permanent one, and it is possible to engrave on plates of copper so impressed.

The *Daguerreotype* has been already referred to, and yields results surpassing in delicacy and beauty any process yet described; a plate of copper plated with silver is exposed to the fumes of iodine and bromine, exposed to the light, and the latent image developed by vapour of mercury; when sufficiently vivid, the salts of silver are dissolved in a solution of hyposulphite of soda, and the picture fixed by the reduction of a thin film of gold over its surface, either by the battery, or by heating a solution of double hyposulphite of gold and soda upon the plate. These pictures are often successfully tinted by the application of dry colour to the surface, and so finished, have, I am disposed to believe, arrived at their maximum of perfection; in some respects they are yet unexcelled, but the increasing excellence of the results obtained by collodion, lead us to expect more progress in that than in any other known process.

The Calotype process, as now usually followed, consists of saturating paper with iodide of potassium (15 to 20 grs., to ℥j of water) drying it, and then immersing in a bath of nitrate of silver and acetic acid (nit. silver 20 grs., glacial acetic acid ℥ss, distilled water ℥j); soak for about five minutes, then immerse for about the same time in a bath of distilled water, and hang it up to dry. These operations must be conducted in a dark room. The paper is then ready for the camera, and may be exposed from five to twenty minutes according to the amount of light. The image is then developed in a saturated solution of gallic acid, washed and fixed in solution of hyposulphite of soda (℥iij to Oj of water), well washed and dried. The surface is then black, with the exception of the image, which appears in white relief upon the black ground. This is called the "Negative." The best negatives are obtained from paper previously "waxed." This is prepared by laying the paper upon melted wax until saturated therewith; and if any unevenness is observed a hot iron may be passed over it. Thin paper is to be preferred for negative pictures, and Messrs. Whatman, Turner, and Canson, prepare a thinner paper for this process.

Mr. Sanford, of London, however, prepares an excellent paper, which answers well both for negative and positive pictures. For producing the best results the paper for positives is "albumenized." A solution is prepared of white of egg and water equal parts (chloride of sodium or chloride of ammonium 5 to 7 grs., or iodide of potassium 5 grs., or bromide of potassium 10 to 15 grs. to the ounce). The paper being coated with this solution is dried and immersed in a bath of nitrate of silver, 120 grs. to ℥j, again dried, and the negative being superimposed in close contact, these are exposed to the light, until the print which may be seen at the edges, is darker than required; when removed, the image appears in heavy light and shade, a dark image on a white ground; to obtain the desired tint, the picture is *toned* by immersion in a solution of hyposulphite of soda containing chloride of silver previously blackened by exposure to light, and a few drops of weak solution of chloride of gold; by varying the quantity of these salts, any desired tone may be produced, and when obtained, the picture is transferred to a solution of hyposulphite of soda (℥iij to Oj water), there fixed, and lastly, thoroughly washed. This process is equally applicable, whether the negative be on paper, or collodion or albumen on glass. The addition of albumen renders the paper less sensitive, but greatly improves the clearness and vigour of the picture. Positives may also be obtained by the aid of gas light: plain paper is saturated with solution of bromide of potassium, 15 grs. to the ounce, and then immersed in a 20 gr. nitrate of silver bath, and dried, the negative being then pressed upon it; it is exposed for about forty or sixty seconds, a few inches from an ordinary gas burner. The paper is then floated over a saturated solution of gallic acid, and the image slowly developes; when fully developed, it is fixed in the ordinary solution of hyposulphite of soda and well washed; it may afterwards be varnished with solution of gelatine, gum, or albumen.

The *Verreotype or glass* process embraces both the pictures obtained from collodion and albumen. Collodion is made from gun cotton, (℥j of ether and ℥ of sp. of wine dissolves about 10 grs. of gun cotton), ℥vi of this collodion is mixed with ℥ij of spirit of wine, saturated with iodide and bromide of potassium. When clear, the collodion is poured evenly over a clean glass plate, and allowed to drain till no streaks or ripples are apparent; it is then plunged steadily into the nitrate of silverbath, which is prepared by dissolving the nitrate in a small quantity of water and adding moist iodide of silver, boil them till no more iodide dissolves, filter, and then make up with distilled water till the bath contains 30 grs. of nitrate of silver to the ounce. When the plate is evenly coated it is transferred in the dark to the camera, and then exposed to light, a few seconds' exposure suffices, and the picture is then developed with a solution of sulphate of iron (10 grs. to ℥j and three drops of nitric or sulphuric acid). A little alcohol or naphtha improves this developing fluid, and formic acid much increases its intensity. After washing, the iodide of silver is removed by a bath of hyposulphite of soda, or cyanide of potassium (20 grs. to ℥j.), the plate again well washed and thoroughly dried: it may be either varnished black over the collodion, or with the crystal varnish (chloroform and mastic) poured over it as the collodion was at first.

By this process we obtain excellent positive pictures; the requirements, however, for negatives, especially for portraits, are somewhat different, but with care, pictures may be obtained by the following means, which answer well for both objects:—The collodion may with advantage be made with paper or flax, instead of cotton, and is further strengthened in texture by the addition of an etherial solution of gutta percha; by this addition the film is rendered stronger and the whites are more opaque. A longer exposure in the camera is necessary and a developing solution of pyrogallic acid (3 grs. to ℥j and ℥ss acetic acid is preferred by many to the salts of iron.)

Bromide of calcium, bromide of cadmium, and bromide of ammonium (10 grs. in ℥ij of spirit to ℥vj collodion), have severally been employed for these pictures

with much advantage. The half tones are well preserved and (developed with iron) the whiteness and delicacy of the tints are excellent. The silver bath for bromides should be 60 grs. to the ℥j. Instantaneous pictures are obtained by adding a few drops of freshly prepared alcoholic solution of iodide of iron to the iodized collodion just before using. This, however, is so sensitive that it is unfit for use in a few hours; it must therefore be prepared at the time of using, and when coloured much must be rejected.

When the negative is too weak to print from, if a dilute solution of bichloride of mercury or perchloride of gold be poured over the plate, and afterwards a dilute solution of ammonia, the silver deposit is rendered much more opaque by the fresh metallic deposit, and when washed and dried a good negative is obtained.

Albumen is used for negatives instead of collodion, and though less sensitive possesses some advantages. To the clear white of each egg add 2 grs. iodide of potassium dissolved in f ℥j of water, and beat the whole up into a froth; then let it stand a few hours to settle, and preserve the clear portion; spread this over the glass plate in the same manner as the collodion, and dry with a gentle heat. Immerse it in a bath (of 60 grs. nitrate silver and ℥j glacial acetic acid to the ounce), dip it in water once or twice, then expose in the camera, develope with gallic acid, and fix with hyposulphite of soda and water. This process has been successful on wood for engraving.

The films of collodion have been successfully removed from the glass to thin paper by applying a varnish of shellac dissolved in a saturated solution of borax to the collodion negative picture, pressing it smoothly and firmly upon thin paper, and immersing the whole in water. The film is thus readily removed on to the paper, and thus, as it is much more portable and equally available as a negative, becomes an important aid to the photographic tourist.

On the chemical theory involved in these several processes, much has been said and thought, but the most elaborate investigations on the subject only partially inform us as to the nature of these changes.

The action of light in all these cases is that of a powerful reducing agent. The metal so reduced possesses a new molecular arrangement or crystalline form, and the reduction, whether effected entirely by exposure, or partly by a chemical reagent, is proportionate to the amount of actinism reflected from the object to the prepared surface. That a chemical property is associated with the rays emitted from all luminous bodies may be considered to be an established fact, and in the solar spectrum this property is possessed principally by the rays at the violet end. It is not, however, found that the actinic force is exactly proportionate to the amount of apparent luminosity, either in the same, or in various sources of light; and although it has been generally supposed that while a blue medium admits all the photogenic rays, a yellow or red medium totally obstructs them—this is only true as it affects *certain* chemical substances, for bromide of silver is sensitive to light passed through yellow glass, and the tartrate is more affected by the yellow than the blue rays. The true nature and relation of the chemical rays of light is certainly but imperfectly understood at present; but the study of photography promises to lead to important discoveries on this subject. The change commencing the reduction of silver, &c., in these processes is no doubt instantaneous, and the reduction is completed by the developing agent, if, therefore, an agent of sufficient energy is found, doubtless the exposure in the camera need be but momentary in all cases, and in this particular, much improvement may be expected.

In the Daguerreotype process the change commenced by light, is carried on by amalgamation with mercury, and a new structural condition of the prepared surface is obtained. In the Calotype, gallic acid is the reducing agent, and protonitrate or sulphate of iron, pyrogallic acid, boracic, tartaric, and formic acids, and other salts, have been employed in the collodion process. The reduction having been effected to the desired extent, all remaining salts of silver are then

dissolved in the cyanide of potassium, hyposulphite of soda, or other solvents. The general decomposition of the silver processes last named may be thus expressed:

Salts of Silver, as	Further reduced and structure changed by	Remaining Salts dissolved by
Ag I	Hg	$Na\ O, S_2\ O_2$
Ag Br	$C_7\ H_3\ O_5$	K Cy
Ag Cl	$C_6\ H_3\ O_3$	$N\ H_4\ O$
&c.	$Fe\ O, SO_3$	&c. &c.
Are partly reduced by Light.	$Fe\ O, NO_5$	
	Fo, O_3	
	&c. &c.	

This may be taken as a type of the decomposition occurring with processes in which other metals are reduced.

In conclusion, I shall point out a few of the most important chemicals which are subject to adulteration or deterioration, and which are in constant demand by the photographer.

Nitrate of silver should be anhydrous in clean crystals, free from iron, lead, and copper. Either of these may be detected by ammonia in excess, which should produce a transparent and colourless solution.

Iodide of potassium should be anhydrous, in cubical crystals, free from carbonate and iodate of potassa; the first effervesces and the last turns brown on the addition of hydrochloric acid. When iodate of potassa is present, or any free acid remains in the cotton, the collodion soon becomes red, aldehydic acid is formed, and iodine set free, and it loses its sensitiveness; it may be restored by adding just sufficient ammonia to neutralize it.

Iodide of ammonium, when yellow, should be dissolved, a little ammonia added, and re-crystallized.

Iodide of iron may be prepared by digesting tincture of iodine with clean iron wire, till ammonia produces a pure white precipitate; it is then filtered, and iron wire kept in the bottles; two to five drops may be added when required to the iodized collodion.

Bromide of calcium is prepared by digesting iron wire and bromine with water till a clear green solution is formed, which is filtered, and digested with hydrate of lime till all the iron is thrown down as peroxide; the solution is then filtered, evaporated to a syrup, and crystallized; it may be kept in an alcoholic solution 5 grs. to ℥j; and of this ℥iss to ℥ij, added to ℥vj collodion.

Protonitrate of iron is made in solution by precipitating sulphate of iron with nitrate of baryta or nitrate of lead, the solution filtered, and about two drops of nitric or sulphuric acid added.

Protosulphate of iron should be in clear blue crystals, if greenish or yellow, it should be dissolved, well boiled sulphuric acid added, filtered and re-crystallized.

Acetic acid should give no precipitate when diluted with chloride of barium or nitrate of silver, and should form a mass of crystals at 40° F., fusible at 62° F.

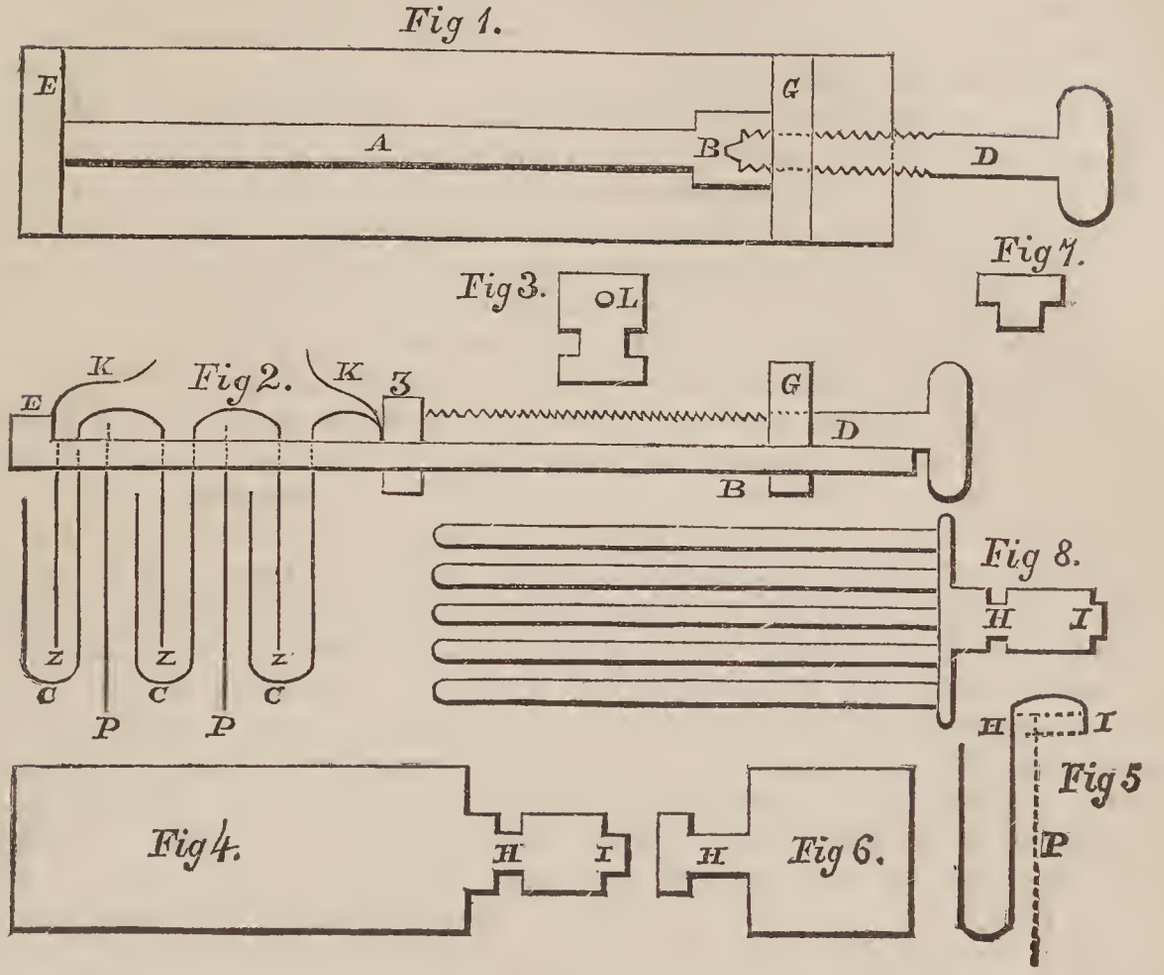
Cyanide of potassium is subject to great adulteration with carbonate and caustic potassa. Some samples contain very little cyanide. It must not effervesce with dilute acids, or give a brown precipitate with protosalts of iron.

Hyposulphite of soda should be free from sulphates and from free sulphur or alkaline sulphurets; if the solution blackens or discolours acetate of lead-paper, it is unfit for photographic purposes.

To those who require further information on these interesting processes, I beg to recommend the excellent little Manual of Mr. De la Motte, entitled "Practice of Photography," or the more elaborate treatise of Mr. Robert Hunt, called "Photography."

SIMPLE FORM OF GALVANIC APPARATUS,

BY MR. SYMONS.



In the February number of this Journal I described an arrangement for a galvanic battery, and when cast-iron plates are used, I do not think a simpler or more easily constructed plan has been published ; but for malleable metals, such as copper, a modification of this plan, on which I have constructed a small battery, offers many advantages. No doubt other plodding Tyros, as well as myself, have found that the great difficulty in constructing home-made batteries is securing an efficient contact between the plates. This is generally done by one or more brass binding screws to each pair of plates, or by soldering, which, of course, must be repeated as often as the zinc requires to be renewed. The following plan is more simple and more efficient, and any one familiar with the battery described by Faraday in his *Experimental Researches*, p. 1119, &c., will observe that this is similar; but the necessity of soldering each pair, and of placing pieces of cork or wood to keep each plate in its place, is obviated; as well as the peculiar and rather difficult construction of the trough, to facilitate the removal of the metals from the liquid when not in actual use. The battery now described is so compact and tight together, that it can be removed instantly without any such contrivance.

Fig. 1 is a piece of wood one-quarter or three-eighths of an inch thick and three or four inches wide ; the length will be regulated by the intended number of the plates and their distance from each other. *A B* is a hole one-half of an inch wide at *A*, one inch at *B*. *G*, figs. 1 and 2, is a stout piece which may fit in to *B*, or be fixed, with a wooden screw, *D*, working in it. *E* is a crosspiece to strengthen the end. Fig. 3 is a stout piece of hard wood adapted to slide in the groove *A*, the hole *L* fitting the screw at *B*, fig. 1. Fig. 4 is a plate of copper, fig. 5 is the same bent. The narrow parts at *H* and *I* are half an inch wide, and opposite each other when bent. Fig. 6 is a plate of zinc. Isolating plates of gutta percha, wood, or waxed paper, should be made of a similar shape, but an inch

larger each way. Fig. 7 is the section of small pieces of gutta percha or wood adapted to *A*. Their length must be regulated by the distance of the plates from each other, which may be a quarter of an inch or less. A piece is placed on each side of the isolating plates, fig. 6, at *H*, and then these plates should fit tight into the copper, as shown by the dots at *P*, fig. 5. The poles *K* are wires soldered to strips of copper, shaped as fig. 3. To arrange the battery put a zinc plate into a copper and introduce them through *B*, figs. 1 and 2, slide them up to *E*, place one of the poles in contact with the zinc, and keep it at a proper distance from the copper by one of the small pieces, fig. 7, slide on each pair of plates with the isolating plates in a similar manner, place the other pole in contact with the last copper, introduce the wood, fig. 3, and screw the whole tight together, when, if placed properly, the battery will appear as in fig. 2, where *Z* shows the zinc, *C* the copper, and *P* the isolating plates. A very neat and convenient Smee's battery may be made in this way, by soldering silver wires a quarter of an inch apart to a piece of copper, as in fig. 8, and treating this as fig. 4; the parts where the silver and copper are soldered together should be well varnished, and the silver can be platinized in the usual way. It will be an advantage, at least to this form, to have a separate cell for each pair, but it is not absolutely necessary; of course then the isolating plates will be useless. The cells can be easily made of thin gutta percha, which can be readily bent and joined with a hot knife or piece of hoop iron, laid for a second or two where the joint is wanted, and held for a minute or so in the required position. I have not yet attempted it, but I think this arrangement could be adopted with batteries requiring diaphragms (a method of supporting these is all that is required); if so, it would be very convenient for Grove's nitric acid battery, the fumes from which preclude the use of the usual connections. The wood, fig. 1, should in this case be wide enough to cover the whole of the cells, so as to confine the fumes. It is well in every case to soak all the wood in a solution of gutta percha in naphtha, and when dry, hold it by the fire a minute or two; this will effectually varnish it. For constant or for only occasional use I do not think a more convenient battery can be adopted than the modification of Smee's, above described. The silver will be more expensive than copper, and the plates a little more trouble to make; but this is only at the first construction, and will be amply compensated by the neatness and lightness of the battery, and the increase of power from the same consumption of zinc. When once put together it is ready for use at any moment, and when its duty is done it can be as quickly laid by ready for action again either the next day or the next year.

Dunster, 14*th December*, 1853.

SYNTHESIS OF THE FATS.

Since the discovery of glycerine by Scheele in 1779, and the subsequent demonstration by Chevreul that it is always obtained by the saponification of a certain class of fats, the opinions entertained as to its function in the constitution of these fats, have been hypothetical and diverse. Chevreul regarded the natural fats as compounds of anhydrous fat acids, with a base which when replaced by a metallic oxide, combined with water, forming glycerine. Other Chemists, and especially Berzelius, opposed this view, maintaining that the fats were not saline compounds, and that the fat acids, as well as the glycerine obtained by saponification, were products of a radical decomposition.

The former view has gained considerable confirmation from the recognition of the analogies existing between glycerine and alcohol in their derivative compounds with organic and inorganic substances. Thus, for instance, the ethers of the fat acids and the natural fats, sulpho-vinic and sulpho-glyceric acids, phosphovinic and phosphoglyceric acids, &c., present such general resemblances, that

there is good reason for inferring an analogy between the constitution of glycerine and alcohol.

M. Berthelot* has recently extended the evidence in favour of this view, by the results he has obtained from an investigation of the derivative compounds of glycerine with acids, both inorganic and organic. The substances which he has obtained belong to different chemical classes, but they may all be represented as acid *plus* glycerine *minus* water. Some of these substances are analogous to the ethers, others are identical with the natural fats. They were prepared by the direct union of their proximate constituents, under the prolonged influence of a more or less elevated temperature in closed vessels; by treating a mixture of glycerine and an ether with gaseous hydrochloric acid; or by the action of gaseous hydrochloric acid upon a mixture of glycerine and acid.

The compounds of the fat acids and glycerine agree in all their physical characters, as well as in percentage composition with those occurring naturally.

M. Berthelot has likewise obtained compounds of glycerine with butyric, valerianic, acetic, benzoic, and hydrochloric acids.

SIBERIAN RHUBARB.

Twelve chests of this rhubarb imported from St. Petersburg were offered for sale in London on the 1st of December.

As we are informed, the history of this rhubarb is curious. It is of the crop of 1793, and the produce of plants raised in Siberia from seeds obtained in the country of the China rhubarb, by order of the Empress Catherine II. of Russia. A few packages of it had remained in the Russian government-warehouses until this year, when it was determined to dispose of them; samples were accordingly sent to London, and subsequently the above-mentioned twelve chests were consigned to a London house for disposal.

We have examined each of the packages in question, and find the rhubarb very perfectly preserved; four of the chests contain larger pieces than the others. It may, however, be described as generally in small pieces; the larger pieces are flat or somewhat cylindrical or semi-cylindrical, from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches long and from 1 inch to $1\frac{1}{2}$ inches broad.

The smaller pieces are evidently from the younger roots; they are in irregular, frequently curved sticks, or in little, irregular, flattish fragments, sometimes not an inch long. In general, however, their length may be said to be from 2 to 6 or even 8 inches, and their breadth about half an inch.

In all the pieces the bark has been completely removed by paring. The larger pieces are perforated. All remnants of cord (if any have been used) have been carefully cut away.

The colour is remarkably good and the fracture mostly shows the admired markings and hue of the best rhubarb. The odour is not peculiar. The taste is somewhat nauseous and bitter,—in some pieces sweetish. In many pieces the grittiness of oxalate of lime is perceptible.

Is it not the produce of *Rheum undulatum*, Linn., which Guibourt has stated† was formerly cultivated on the large scale in Siberia by order of the Russian government, but of which the culture was abandoned from it not affording rhubarb equal to that of China?

ON THE MEDICINAL PROPERTIES OF THE COFFEA ARABICA.

BY W. HAMILTON, M. B.

It is an important fact in vegetable physiology, which becomes every day more fully developed, that the active properties of the fruit are frequently, if not universally diffused in a greater or less degree throughout the leaves, bark,

* Comptes rendus, July, 1853.

† *Hist. des Drog.* Éd. 4ème. Tome ii., p. 396.

and other parts of the plant; thus, the leaf of the *Vitis vinifera* has been long known to possess the same property of yielding wine by proper manipulation as the berry; and a similar property is now ascertained to reside in the leaf of the Coffee shrub, which, by due torrefaction, as has been recently shown in the Pharmaceutical Journal,* is capable of yielding a beverage equal in all its sensible qualities to that obtained from the torrified berries. But the importance of this discovery may not be confined to the economical, but may also be found to extend to the medicinal properties of coffee, which, becoming reduced in price by this important discovery, may possibly come more extensively into use.

Calculous complaints are among the most frequent and perhaps the most painful maladies of our island, and are not uncommonly connected with gout and rheumatism; but it is not generally known that the free use of strong coffee, unadulterated with chicory, or any of those other substances with which it has been too much the practice of dishonest dealers to deteriorate the genuine article, is almost a specific for these painful afflictions.

It has been observed by Dr. Moseley, in his *Treatise on Coffee*, that "The great use of coffee in France is supposed to have abated the prevalence of the gravel. In the French colonies, where coffee is more used than in the English, as well as in Turkey, where it is the principal beverage, not only the gravel, but the gout, those tormentors of so many of the human race, are scarcely known.

"Du Four relates, as an extraordinary instance of the effects of coffee in gout, the case of M. Deverau. He says this gentleman was attacked with gout at twenty-five years of age, and had it severely till he was upwards of fifty, with chalk stones in the joints of his hands and feet; but, for four years preceding the account of his case being given to Du Four to lay before the public, he had been recommended the use of coffee, which he adopted, and had no return of the gout afterwards."

But its efficacy is not confined to the cure or mitigation of these maladies. Sir John Floyer, who had suffered under asthma for more than sixty years without finding relief from any of the numerous remedies he tried, was at length cured, when above eighty years of age, by the free use of coffee.

Other instances of the efficacy of coffee might be adduced, but enough perhaps has been already stated to induce those who labour under these maladies to make a trial of its efficacy, and convince the dealers in the article, of the inhumanity, no less than the dishonesty of imposing spurious, in place of unadulterated coffee upon their credulous customers.

It is to be hoped that the important fact of the capability of cultivating the coffee shrub in the lowlands, no less than the sub-Alpine regions of the tropics, for the harvest of its leaves, may lead to its more extended planting both in our East and West Indian possessions, since not only would an additional value be thus given to ground little suited to other tillage, but a valuable addition made to the staple crops without increasing the amount of human labour in their production.

When the dried coffee leaves become, like those of the tea of China, an established article of import into this country, it may be hoped that the market price will undergo such a reduction as to render adulteration no longer profitable, and to induce thousands to prefer this exhilarating beverage to the vile compounds of sloe and rose leaves palmed upon purchasers as the genuine tea of China.

14, *Octagon, Plymouth, 30th November*, 1853.

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* For November, page 207 and seq.

MAGNETIC OXIDE OF IRON AND IRON REDUCED BY HYDROGEN.

Princes Square, Finsbury, 6th December, 1853.

Dear Sir,—I take the liberty of enclosing you a paper, copied from the last number of the *Chemist*, which, in justice to myself and to Mr. Robertson, I have had printed for circulation, and I ask your perusal of it, leaving it to you to insert it in the next number of the *Pharmaceutical Journal*, if you think right. You are aware that the competitive spirit in our business has been very severe, and has given rise to remarks of a disparaging nature against my preparations from time to time, that, but for the many friends who have from my commencement supported me, I could not have withstood; and as you have, through the medium of your Journal, been one of them, I venture to ask your acknowledgment on this occasion, that I have not been fairly dealt with, or at least that I am justified in my conduct by the circumstances of the case.

I am, dear Sir, yours very faithfully,

W. E. Heathfield.

[The paper referred to above is embodied in the subjoined statement which we have received from Mr. Morson. We fully concur with Mr. Heathfield in the opinion that, "the competitive spirit in the business" does not justify the circulation of "remarks of a disparaging nature" by one manufacturer against the preparations of another. In the present instance we express no opinion as to the merits of the question at issue, but place before our readers the communications from each party, with the analyses and other evidence. We should not have devoted so much space to communications of a controversial nature, if the subject had not been one likely to interest our readers, on account of information contained in the chemical reports, and the remarks on a preparation the nature of which is the subject in dispute. The subject is referred to in a paper by Mr. J. T. Barry, read at a Meeting of the Pharmaceutical Society, December 8, 1842. See vol. i., page 307.—Ed.]

ON THE SUBSTITUTION OF MAGNETIC OXIDE OF IRON FOR IRON IN THE METALLIC STATE REDUCED BY HYDROGEN.

BY MR. T. N. R. MORSON.

The preparation which is the subject of the following observations is known as *Iron reduced by hydrogen—Fer reduit—Quevenne's iron*, &c. &c., and is described in the Dublin Pharmacopœia as *Pulvis Ferri*. It is, in fact, metallic iron in a finely divided state, and its chemical characters are those of iron filings, from which it differs only in its state of division. If acted upon by diluted sulphuric acid it evolves hydrogen gas, and forms a proto-salt. To prepare it, however, in a state fit for internal administration is not easy, and various processes have been suggested for this purpose, the most approved of which consists in the reduction of peroxide of iron by hydrogen gas at a red heat. It is rarely obtained free from a little sulphuret and carbon, but these impurities, however desirable it may be to avoid them, do not materially diminish its therapeutic action. It has acquired some importance from its employment, with most beneficial results, in many diseases requiring chalybeate medicines, its efficacy depending on its ready solubility in the weak acids of the stomach, a property which is not possessed by the oxides of iron, and especially by the magnetic oxide.

In the ordinary course of business we have furnished this article to our friends, when required, and amongst others to Messrs. Duncan, Flockhart, and Co., of Edinburgh, a firm well known, and of most high and deserved reputation. No complaint was made of the preparation until the 24th of September last, when we received a letter from those gentlemen inclosing two samples, one consisting of "reduced iron" as furnished by us, the other a black powder, with

a request to be informed in what respect these differed, as both were sold under the same name, and the latter had been represented as superior to ours, and supplied in Edinburgh at one-third the price we had charged. No mention was made of the source from which the black powder had been obtained, nor any further information given. Upon examination I found the black powder to be magnetic oxide of iron, and wrote to my correspondent to that effect. Messrs. Duncan and Co. were satisfied with this reply, and afterwards informed me that the black powder had been furnished by Mr. Heathfield as *Quevenne's iron*. I heard no more on the subject until the 19th of November, when I received another letter from Messrs. Duncan and Co., inclosing a comparative analysis by Dr. George Wilson, of Edinburgh, of Heathfield's and of Morson's *Quevenne's iron*, and representing the former as containing seven per cent. more of iron in the metallic state than the latter. Shortly afterwards, the following article appeared in the *Chemist*, at page 192 of the number of that Journal for December:—

"PULVIS FERRI, OR QUEVENNE'S IRON."

"Our attention has been called to a case, the particulars of which we lay before the public with a view of doing justice to a manufacturer of pure chemicals, who is well known to our readers, and the character of one of whose preparations has been assailed, evidently not only without reason, but absolutely in defiance of the fact, that the preparation in question as has since been proved, was seven per cent. superior to that manufactured by the very man who pronounced a strong opinion of its worthlessness. Doubtless the calumny has been spread far and wide among Pharmaceutical Chemists; we therefore feel justified in lending our columns to a short statement of the facts, from which our readers will see that we are only doing an act of justice.

"The preparation called 'Pulvis Ferri,' D. Ph., was introduced on the continent by MM. Quevenne and Miquelard, under the name of "fer réduit," and ordered in the Dublin Pharmacopœia to be made by reducing the peroxide of iron by means of hydrogen gas, with certain precautions.

"Mr. Heathfield, of Princes Square, Finsbury, having sent some of this preparation of his own manufacture, in the state of a nearly black powder, to Mr. Robertson of George Street, Edinburgh, one of the first and most careful dispensers in that city, was apprised a short time since by Mr. Robertson, that Mr. Hamilton of Dundee had expressed much disappointment at finding that the preparation which he had been dispensing, and which had been procured from Messrs. Duncan, Flockhart, and Co., of Edinburgh, being of a slate colour, had produced a totally different appearance in a mixture from what the patient had had from Mr. Robertson. Messrs. Duncan and Co., on being applied to by Mr. Hamilton, informed him that they had been offered some of 'Quevenne's Iron' at one-third of the price charged by Mr. Morson, whose price was 4*s.* 6*d.* per oz.; and some of that cheaper preparation being sent to Mr. Morson, he had stated that it was nothing more than magnetic oxide of iron, worth 6*d.* an ounce. Mr. Robertson then sent for analysis, to Dr. George Wilson, Professor of Chemistry, two samples of the 'Quevenne's Iron,' one prepared by Mr. Heathfield, and the other by Mr. Morson. Dr. Wilson analysed these samples, and found that of Mr. Heathfield to be seven per cent. purer than Mr. Morson's.

"Now, either Mr. Morson was ignorant of the quality of the article of which he expressed an opinion, or he most unfairly condemned the preparation of another manufacturer.

"Great credit is due to Mr. Robertson for the determined and manly way in which he persevered in sifting this matter, and too much praise can scarcely be bestowed on him for this, or for his honourable anxiety as to the purity of the medicines he dispenses.

"We have every confidence in Mr. Heathfield's scrupulousness as to the quality of his manufactures. It appears to us that an attempt has been made in this instance to injure the reputation of his preparations; and we are glad to find, that on examination, his 'Quevenne's Iron' turned out to be better than that with which it was compared."

Feeling convinced that I was not in error respecting the nature of the substance sent to me by Messrs. Duncan and Co., and thinking it possible that the sample analysed by Dr. Wilson as *Heathfield's Quevenne's iron, or reduced iron*, was not the same as that I had examined, I immediately wrote to Dr. Wilson, requesting him to favour me with a small portion of the article referred to in his report, which was being circulated to my disparagement. This letter remaining unanswered at the end of a week, I wrote again, and then received his reply, No. 7 of the subjoined correspondence, in which he referred me to Mr. Robertson, of Edinburgh, as the party for whom he had performed the analysis, at the same time declining to send me the sample. I then addressed Mr. Robertson to the same purport, but with no better success, as Mr. Robertson's letter, No. 9, of the subjoined correspondence, will show.

Failing in my endeavours to elucidate the truth in these directions, and having ascertained from Mr. Robertson that he had supplied to Messrs. Duncan and Co. some of *Heathfield's Quevenne's iron*, taken from the same parcel as the sample sent to Dr. Wilson for analysis, I requested Messrs. Duncan and Co. to have this analysed by men of undoubted competence to decide the question at issue. Messrs. Duncan and Co. had also received, direct from Mr. Heathfield, some of his so-called *Quevenne's iron*, and a sample of this, and also of that obtained from Mr. Robertson, was accordingly sent by Messrs. Duncan for analysis to Dr. Gregory of Edinburgh; to Dr. Stenhouse, of St. Bartholomew's Hospital; to Dr. Williamson, of the Birkbeck Laboratory; and to Dr. Garrod, of University College. The reports thus obtained, through a perfectly independent channel, from so many competent judges, will, I trust, be considered to have satisfactorily established the correctness of my original statement, and the injustice of the imputation which has been so unwarrantably circulated to my serious injury.

REPORTS OF ANALYSES OF HEATHFIELD'S AND OF MORSON'S QUEVENNE'S IRON.

"*To* Mr. Duncan, "*Dec.* 16*th*, 1853.

"My dear Sir,—I have carefully analysed the three specimens of Quevenne's iron you handed me, and with the following results:—

"Of No. 1, Heathfield's obtained direct, 10 grains yielded 10.75 of peroxide of iron. Had it been metallic iron 10 grains should have yielded 14.3 grains of peroxide; but if black or magnetic oxide, of which it has the aspect and density, it would yield from 10 grains—

"If of the formula Fe_3O_4 ..... 10.3 grains
" " Fe_4O_5 ..... 10.5 grains
It actually yielded ..... 10.7 grains

"Hence this specimen is black oxide of iron almost pure. I have not been able to detect in it even a trace of metallic iron.

"No. 2, Heathfield's, from Mr. Robertson.

"12.1 grains yielded ..... 12.9 peroxide
12.1 of metal should yield ..... 17.2 grains
12.1 of black oxide, Fe_3O_4 ..... 12.5 grains
12.1 of ditto, Fe_4O_5 ..... 12.7 grains

"This is therefore identical with No. 1, and contains not a trace of metallic iron. The small discrepancy between the analyses and theory depends on the presence of a trace of some impurity too trifling to be worth notice in any way.

"No. 3, Morson's preparation. This, which has precisely the colour and density proper to iron reduced by hydrogen, I have analysed for my own satisfaction. 10.3 grains of it yielded 13.9 of peroxide. 10.3 grains of pure iron should yield 14.7 of peroxide.

"It is therefore metallic iron, as it professes to be, its composition being—

"Iron 97.3
Impurities, probably carbon, sulphur, &c., present in all iron (silica probably also) 2.7

100.0

"It is not, I believe, possible to manufacture on any considerable scale iron in this shape purer than this specimen is.

"I have to apologize for the time that has elapsed, but I have found it impossible, although not a moment has been lost, to furnish these analyses in such a manner that I could pledge myself for their accuracy, sooner than this morning. The mere washing of the precipitated peroxide has required gallons of distilled water.

"The above results are as exact as I can make them, and will, I am certain, be confirmed by any chemist who shall examine the same specimens.

"I remain, yours very truly,

"William Gregory, M.D., F.R.S.E.,
"Professor of Chemistry."

"*To* Messrs. Duncan, Flockhart and Co.

"*St. Bartholomew's Hospital*, 13*th December*, 1853.

"Gentlemen,—I have carefully examined the two specimens of a preparation of iron, marked respectively '℥ij Heathfield's Quevenne's iron obtained direct,' and '℥i Heathfield's Quevenne's iron obtained from Mr. Robertson,' which you sent me a few days ago.

"I find that neither of them contains any metallic iron, but that they consist of a mixture of the protoxide and sesquioxide of iron in nearly atomic proportions, so as to form chiefly magnetic oxide of iron. They likewise contain a very appreciable amount of carbonaceous matter.

"I remain, Gentlemen, your obedient servant,

"John Stenhouse, LL.D., F.R.S.,
"Lecturer on Chemistry to St. Bartholomew's Hospital."

"*To* Messrs. Duncan, Flockhart and Co.

"*University College, London*, 9*th Nov.*, 1853.

"Gentlemen,—I had the pleasure of receiving to-day your letter of yesterday, enclosing a specimen of preparation labelled 'Heathfield's Quevenne's Iron," and in reply to your inquiry, regarding the nature of the substance, I have to state that it consists essentially of sesquioxide and protoxide of iron, and corresponds in its chemical deportment to the 'magnetic oxide of iron,' mixed with a small quantity of carbon.

"I am, Gentlemen, yours obediently,

"A. W. Williamson,
"Professor of Practical Chemistry in the Birkbeck Laboratory."

"*To* Messrs. Duncan, Flockhart and Co.

"63, *Harley Street, London, December* 12*th*, 1853.

"Gentlemen,—I have received a sealed packet containing a black powder, and labelled Quevenne's iron (Heathfield), which I find to be the magnetic oxide of iron with a trace of sulphuret, and not metallic iron.

"It possesses the following properties:—

"1. It is attracted by the magnet.

"2. Of a black colour.

"3. Dissolves in acids with but a trace of effervescence, due to the evolution of a little sulphuretted hydrogen.

"4. Its acid solutions are precipitated black with an alkali.

The Fer Réduit of Quevenne, or Pulvis Ferri of the Dublin Pharmacopœia is,

"1. Attracted by the magnet.

"2. Of a steel grey colour.

"3. Dissolves with a powerful effervescence in acids, and evolves hydrogen, usually mixed with a little sulphuretted hydrogen, from the preparation containing some sulphuret.

"4. Its acid solutions are precipitated green with an alkali.

"I have extensively employed the Fer Réduit in Medicine, both in private and hospital practice, and think that the black or magnetic oxide of iron should not be substituted for the metallic iron.

"I am, Gentlemen, your obedient servant,

(Signed) "A. B. GARROD, M.D.,

"Professor of Materia Medica and Therapeutics at University College Hospital."

It will be obvious on the perusal of these reports, that the question at issue was not one of comparative purity, but of the substitution of one article for another of wholly different properties. The case is analogous to that which occurred some years ago, referred to in the Pharmaceutical Journal, vol. viii., page 577, when acetate of zinc and sulphate of quinine, merely flavoured with a little oil of valerian, were substituted for the costly valerianates of those bases.

Had Mr. William Eames Heathfield published the statement which has appeared in the *Chemist*, and which has been otherwise extensively circulated throughout the trade, on his own unsupported authority, I should not have thought it necessary to resort to the means I have taken for refuting such an attempted perversion of truth, but the statement being apparently confirmed by the analysis of Dr. Wilson, I could not permit it to remain unnoticed. It will be for the distinguished author of the *Life of Cavendish*, whose name I regret to have been obliged to mix up in this matter, to explain the results of his analysis which are so widely different from those obtained by other equally eminent Chemists. The letter of Mr. Robertson needs no comment.

19, *Southampton Row, London, Dec.* 19, 1853.

For the more complete elucidation of the subject, the following correspondence is appended.

No. 1.

To Messrs. MORSON and SON. *Edinburgh, 24th September*, 1853.

GENTLEMEN,—We enclose a small sample of your own Quevenne's metallic iron, and some of another maker's, which is very much blacker in colour. The powders by recipe which we have invariably prepared with yours, present a different appearance, and we have had a complaint from a gentleman who had got a dozen from another house. On inquiry, we have found some of our contemporaries are using the black kind, a little of which we send you, in order that you may tell us wherein the difference lies. It costs 1*s.* 6*d.* per ounce only.

Your attention will oblige, yours, &c.,

DUNCAN, FLOCKHART, and Co.

No. 2.

To Messrs. DUNCAN, FLOCKHART and Co *September 27th*, 1853.

GENTLEMEN,—I have no difficulty in answering your query respecting Quevenne's iron, which is iron reduced from its oxide by hydrogen gas; the black powder you have seen sold and used for it, is the common magnetic oxide of iron, and I shall be glad to sell it you at 6*d.* per oz., if you prefer the substitution to the article itself. It is not at all difficult to distinguish these preparations from each other. Sulphuric acid, diluted with twice its bulk of water, will have little action on the black oxide, but liberates hydrogen from the reduced metal—I am sorry to say, generally with a trace of sulphuretted hydrogen, from the difficulty of sufficiently washing the oxide before reduction; but this is unimportant, and further it is prepared by Quevenne's process.

Yours, &c.

T. N. R. MORSON.

No. 3.

To T. MORSON, Esq., London. *Edinburgh, 19th Nov.*, 1853.

SIR,—We beg to enclose two samples of Quevenne's Iron, the one your own manufacture, the other Mr. Heathfield's; also copies of an analysis made by Dr. George Wilson, of two samples sent him by Mr. Robertson, and his letter accom-

panying the same, our reason for doing so is simply this: some time ago, a recipe for a set of powders, containing this preparation, was dispensed by Mr. Hamilton, of Dundee; these were returned to him by his customer, as having been wrongly prepared, in consequence of their being quite different in colour from those he had had made up by Mr. Robertson of Edinburgh. He was told in addition, that the Physician who had written the prescription was of the same opinion, viz., that those prepared in Edinburgh were of the proper kind. Mr. Hamilton (considering that if a report of this kind was circulated in the neighbourhood, it would be injurious to his reputation as a dispenser of genuine medicines) took the opportunity of mentioning the circumstance to us when in Edinburgh, as being the parties from whom he had received his supply of the preparation, and wished our opinion as to what he should do. At that time we opened a bottle, which had been got in from Heathfield's, and gave a small quantity, as it corresponded in colour with what he was told had been got at Mr. Robertson's ; at the same time we mentioned to him the difference in the price. Shortly after this, you may recollect we wrote you, with a sample of your own metallic iron, and another of this *black kind*, wishing an explanation of the difference in the appearance of the two, and the substance of the answer we got from you was communicated to Mr. Hamilton in a note, in which we stated our determination to abide by your preparation in dispensing our prescriptions. We heard nothing more about the matter until yesterday, when we received Mr. Heathfield's communication, with the result of Dr. Wilson's experiments, from samples furnished him by Mr. Robertson. This, so far as we recollect, is a correct statement of what has happened, but as we do not wish to be the occasion of any disagreeable feeling betwixt the different parties, we think the best plan is at once to acquaint you with the subject. The enclosed are accordingly sent, in order that you may do what you may consider proper.

When Mr. Heathfield was in Edinburgh a few months ago, we were induced to order 1lb. of his Quevenne's iron, as the price was only 1*s.* 6*d.* per oz.; but with this solitary exception alluded to, we have never used it. The colour of yours corresponds exactly with the description given by Neligan, at page 456 of his work on medicines, and we also found yours effervesce briskly with diluted sulphuric acid, emitting hydrogen, which exploded when ignited. This result we did not find with Mr. Heathfield's. We have not, however, examined either so minutely as to be able to answer the correspondence now entered upon. We regret exceedingly to be obliged to trouble you, but in the circumstance we cannot avoid it. We will be glad to hear from you when convenient, as to your movement in the matter. In the mean time we leave it entirely in your hands, and we are, dear Sir,

Your most obedient Servant,
DUNCAN, FLOCKHART, and Co.

N.B.—We may mention, that on examining our account against Mr. R., we find he had got ℥ij of your preparation on the second of this month.

No. 4.

Laboratory, Surgeon's Hall, Nicolson Street,
14*th November*, 1853.

From the accompanying detailed analysis, it appears that neither Heathfield's nor Morson's Quevenne's iron is pure iron, but that Heathfield's makes the nearest approximation to it. Quevenne's iron, theoretically, is pure metallic iron, but in actual fact probably never makes more than a distant approximation to it. The specimens sent to me contain in addition to hygrometic or accidental moisture, oxide of iron, sulphuret of iron, and an insoluble incombustible substance, which has not been minutely examined, besides metallic iron, of which the specimens should alone consist.

The moisture has no doubt been absorbed from the atmosphere by the finely divided powder. The oxide of iron results either from the hydrogen gas not being passed over the original oxide, from which the substance is prepared, for a sufficient length of time, or from the substance being taken out of the tube in such a condition that it can take back oxygen from the air. The sulphuret of iron is derived either from the ordinary commercial oxide of iron, containing some sulphate of iron, having been employed to yield the Quevenne's iron, or from the hydrogen passed over the oxide containing sulphuretted hydrogen.

The insoluble matter was, I presume, purposely added, and something, I think, is prescribed to be added by the Dublin Pharmacopœia. So far as *relative* purity i concerned, Heathfield's specimen is decidedly the better of the two. As compared with Morson's, it contains more iron and less oxygen, less sulphur, less insoluble matter, and less water.

If the amount of metallic iron present be made the standard of purity of a substance professing to be all metallic iron, then Heathfield's sample is 7 per cent. purer.

(Signed) GEORGE WILSON.

Analysis of two samples of Quevenne's iron received from James Robertson, Esq., Druggist, George Street, Edinburgh.

	No. 1. Morson's.	No. 2, Heathfield's.
Metallic iron	71.35	75.55
Sulphur as sulphuret of iron	0.51	0.41
Water	2.01	1.43
Insoluble in acids	2.32	1.24
Oxygen and loss in analysis	23.61	18.38
	100.00	100.00

GEORGE WILSON, M.D., *Lecturer on Chemistry.*

No. 5.

To Dr. GEORGE WILSON. 22*d November*, 1853.

DEAR SIR,—A copy of a report by you of an examination of two specimens of Quevenne's metallic iron, purporting to be No. 1, Mr. Morson's, No. 2, Mr. Heathfield's, having been forwarded to me, I am reluctantly obliged to trouble you with this letter, fully assured, however, that you will excuse my so doing, and kindly send me (if you have any remaining) a few grains of the No. 2 specimen, Mr. Heathfield's, which you examined. As I do not in the slightest degree dispute the accuracy of your analysis, it is only the No. 2 specimen I desire to see. It is proper to inform you what has caused this inquiry: I received from Edinburgh, some short time since, a complaint of the price charged for Quevenne's iron furnished by myself, and enclosing a sample from another manufacturer sold at a very reduced price, requiring from me an explanation of my supposed overcharge. I examined the specimen sent me, and found it magnetic oxide of iron, which would account for my being undersold. I received the sample which I examined from Messrs. Duncan, Flockhart, and Co., of your city, and it is the only one at present respecting which any question has arisen on my part, and they can, I doubt not, give you a specimen to examine, and state if it resembles even the specimens sent you for analysis.

With every apology for the necessity for so troubling you,

Believe me, my dear Sir,

T. N. R. MORSON.

No. 6.

To Dr. GEORGE WILSON, *Nov.* 29*th*, 1853.

DEAR SIR,—On the 22nd instant I addressed a letter to you, requesting the favour of your sending me a few grains of Quevenne's metallic iron, examined and reported on by yourself as Heathfield's, and gave you my reason for making the inquiry, with other particulars; I regret to say that I have not yet received your answer.

You must be well aware that I cannot remain in silence on this subject, which is calculated to do me some injury from the use made of your report, and must, therefore, request the favour of a reply at your earliest convenience.

Yours truly,

T. N. R. MORSON.

No. 7.

To T. MORSON, ESQ. *College of Surgeons, Edinburgh, November* 30*th*, 1853.

SIR,—I regret that an oversight in putting aside your letter of the 22d ult. led to my neglecting to answer it. I have now to reply to it, and to a second which reached me to-day.

So far as willingness to oblige a skilful and experienced Pharmacien like you is

concerned, a specimen of any preparation of mine is at your service; but you cannot seriously propose to me that I should forward to you a substance which I was professionally employed to analyse at the request and cost of another party.

Such analyses are by every Chemist regarded as confidential, and I should forfeit the trust reposed in me, were I to send you a portion of a powder, which I was desired to analyse solely for the information of the person who gave me the powder.

All that I can do is to name that party and to refer you to him, for what you ask from me. I made the analyses to which you refer at the request of Mr. Robertson, Druggist, George Street, Edinburgh. They were made for his satisfaction, with specimens of the origin of which I know nothing beyond what was stated to me; but Mr. Robertson can give you, I do not doubt, full information concerning them.

You mention further, that "you cannot remain silent." I am at a loss to understand this reference, and can only reply, that I have no interest in silence being either kept or broken in connexion with my analyses.

Yours very truly,
GEORGE WILSON.

No. 8.

To Mr. ROBERTSON, George Street, Edinburgh.

19, *Southampton Row, Russell Square, London, Dec. 2nd*, 1853.

DEAR SIR,—Mr. Heathfield having published an article in the *Chemist*, and also circulated a report, of a comparative analysis of Quevenne's iron, purporting to be prepared by me and himself, from samples furnished by you, I shall feel personally obliged by your sending me, to the amount of postage stamps inclosed, a small quantity of Mr. Heathfield's preparation, as *sent by you to Dr. G. Wilson*, as I wish for an authenticated sample direct from yourself. The specimen I have received from Messrs. Duncan, F., and Co., as furnished by Mr. Heathfield to them, is magnetic oxide of iron, as is also a specimen obtained from your house. Either, therefore, Dr. Wilson has examined a different preparation, or been totally mistaken in his analysis, and it is difficult to conceive the latter, as a very simple experiment—the evolution of hydrogen by sulphuric acid—is sufficient to distinguish them from each other.

My only object is to elucidate the truth, and I feel assured you will not refuse to assist me in this matter.

Yours truly,
T. N. R. MORSON.

No. 9.

To Mr. MORSON. *Edinburgh, Dec. 3rd*, 1853, 35, *George Street.*

DEAR SIR,—I am in receipt of yours of yesterday's date. I have not seen the article in the *Chemist*, which you referred to, but if it contains a transcript of Dr. George Wilson's report as handed by me to Mr. Heathfield, I feel satisfied it is correct.

These analyses were conducted at my instance and expense, and solely with the view of confirming myself in the belief, that Mr. Heathfield's preparation, as dispensed by me, was what it purported to be, and of repelling the offensive and reiterated charges of its beiug *magnetic oxide of iron.*

The charges were made, as I was assured, on your authority; and I was thus led to submit also to Dr. Wilson a specimen of your preparation procured from Messrs. Duncan, Flockhart, and Co., and the result I very naturally and properly transmitted to Mr. Heathfield. The portion of Heathfield's Quevenne's iron, which I gave to Dr. Wilson for analysis, was taken from the package returned to me from Mr. Hamilton of Dundee, and I supplied Messrs. D., F., and Co., with an ounce of the same article a few days ago. I therefore beg to decline complying with your request to send you a specimen, as I consider the doing so as being quite unnecessary for the "elucidation of the truth."

I am, dear Sir, yours truly,
J. S. ROBERTSON.

BROMINE AND IODINE IN CHILI NITRE.

From the daily increasing consumption of Chili nitre, it is advisable that some attention should be paid to the small quantities of iodine and bromine present in it. These substances would be accumulated in the mother-liquors of the refining operations, and their quantity would render them worth extraction.

Rebling* states, that in the liquors from the purification of 25lbs. of Chili nitre, amounting to a few pounds, he obtained by the addition of a solution of sulphate of copper in sulphurous acid water, a precipitate equivalent to 4.5 grs. iodide of sodium.

The purification was effected in the following manner:—The salt, broken into pieces about the size of peas, was briskly agitated with cold water for a few seconds, and the liquid poured quickly off before the suspended matter was deposited. This operation was repeated a few times until the salt was colourless, when it was drained upon a funnel and washed with pure water until no further reaction with silver salt was given.

Grüneberg† has examined the liquid which flowed spontaneously from 50 tons of raw Chili nitre that had been stored in a damp place and the mother-liquors obtained from the subsequent purification of this nitre.

He first proceeded by removing from these liquors as much as possible of the crystallizable salts, chloride of sodium and nitrate of soda. During the evaporation for this purpose a remarkable circumstance presented itself. As the concentration increased the liquid became more turbid and brown, evolving a sensible odour of iodine, and when treated with starch gave a deep blue colour.

It subsequently appeared that this was owing to a decomposition of iodide of magnesium. The addition of caustic soda prevented this inconvenience.

When the liquids had been concentrated as much as possible they weighed 90lbs. The iodine was separated by heating with iron filings and adding gradually sulphate of copper as long as there remained any iodine or iodic acid in solution. During the precipitation the liquid again became brown from the liberation of iodine. By this action of sulphate of copper upon iodide of sodium $= 2\,(I\,Na) + 2\,(Cu\,O\,SO_3)$ there were produced $2\,(Na\,O\,SO_3) + Cu_2\,I + I$. The brown colour was, however, removed by the gradual action of iron filings, for from $I + 2\,Fe + 2\,(Cu\,O, SO_3)$ there were produced $2\,(Fe\,O\,SO_3) + Cu_2\,I$, so that all the iodine of the iodide of sodium was ultimately converted into iodide of copper, while the iodine of the iodates was contained in the precipitate as proto-iodate of iron and iodate of copper.

This precipitate washed, dried, and mixed with broken glass, to render it more porous, was treated with sulphuric acid and oxide of manganese. On distillation the action was at first violent, and a large quantity of iodine mixed with chloride of iodine passed over. The water into which the product of distillation passed became brown from the solution of chloride of iodine, which after a time began to decompose and deposit iodine, generating at the same time oxygen and hydrochloric acid.

Grüneberg obtained in this manner 18 ounces of iodine.

In order to obtain the bromine, the liquid from which the iodide of copper had been precipitated was filtered, evaporated to the consistence of a syrup mixed with oxide of manganese and sulphuric acid, distilled, and the products of distillation led into a solution of caustic potash. The bromine obtained amounted to somewhat more than half an ounce.

According to these results the Chili nitre would contain

Iodine	0.000010
Bromine	0.000005

SACCHARINE CARBONATE OF IRON AND MANGANESE.

BY S. T. SPEER, M.D., OF CHELTENHAM.

The introduction of the metal manganese into the domain of therapeutics, due, I believe, in the first instance, to the Belgian physician M. Hannon, has within the last two years been followed by a careful investigation of its medicinal properties on the part of several French physicians.

From them, it would appear that this metal when given in combination with iron, is capable of rendering signal services in those diseases where iron alone has been

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* *Archiv. der Pharmacie.*

† *Journ. für praktische Chemie*, October, 1853.

hitherto prescribed, and at the present moment, the ferro-manganic preparations hold a prominent place in continental practice. As I am not, however, aware that they have yet undergone a trial in this country, or at least one, the results of which have been made public, I venture to state shortly, what a limited experience of two years enables me to say upon this subject; inasmuch as during that period I have embraced every legitimate opportunity of prescribing the combination mentioned at the head of the present communication.

In a paper published in the *Revue Medico-Chirurgicale* for June, 1849, M. Hannon first suggested the following preparations of manganese, viz., the carbonate, the tartrate, the phosphate, the neutral malate, and the iodide. With none of these was a similar salt of iron associated.

M. Petrequin, of Lyons, however, having taken up the subject of manganic preparations, published in the *Bulletin General de Therapeutique* for March the 15th and 30th, 1852, two papers containing the results of his experience relative to the utility of the metal in question when administered in conjunction with iron.

The preparations employed by him consisted chiefly of the iodide and lactate of iron and manganese in the form of syrup, and of the carbonate of the two metals in the form of pill.

Being desirous of trying the effects of such a combination in some of the numerous cases where iron is usually indicated, I endeavoured to associate the two metals in the shape of a carbonate of the protoxide, and to retain them in this condition through the medium of sugar, as is done in the case of the saccharine carbonate of iron, very recently introduced into the London Pharmacopœia—a chalybeate perhaps superior to every other, and possessing an advantage which few practitioners will not recognise in these days of tasteless globules, namely, a complete freedom from that nauseous inky flavour which the preparations of iron usually impart to the palate.

The following is the formula I suggested, and according to which the preparation in question was made:—

Saccharine Carbonate of Iron and Manganese.

Take of
- Finely powdered sulphate of iron ..... ℥iij. ℥j.
- Carbonate of soda ..... ℥v.
- Sulphate of manganese ..... ℥j. ℈j.
- White sugar ..... ℥iiss.

Dissolve each of the three first mentioned ingredients in a pint-and-a-half of water, add the solutions, and mix them well; collect the precipitate on a cloth filter, and immediately wash it with cold water; squeeze out as much of the water as possible, and, without delay, triturate the pulp with the sugar, previously reduced to a fine powder. Dry it at a temperature of about 120° Fah.

The compound thus prepared is a powder of a reddish-brown colour, and devoid of all taste, save that imparted by the sugar, with which the salts of the two metals are conjoined. The dose is five grains, gradually increased up to ℈j., three times a day; it should be given with the meals, or at least immediately after.

In the papers alluded to above, Mr. Petrequin asserts, that cases of anæmia, which had resisted the administration of iron alone, yielded rapidly to a combination of this metal with manganese. In confirmation of this statement, I may say, that in two cases which lately came under my notice, the one of chlorotic anæmia, with amenorrhœa; the other of uncomplicated traumatic anæmia, both of long standing, the saccharine carbonate of iron and manganese succeeded entirely, after iron alone had failed. In each of these cases, its effects upon the composition of the blood, and through this, upon the general health, were extremely rapid, thus affording a contrast to the effects of the simple preparations of iron, which, even when eventually successful, are usually slow in their operation.—*Medical Times and Gazette.*

SUPPLY OF PERUVIAN GUANO.

(From the *Shipping and Mercantile Gazette*, Dec. 6, and the *Times*, Dec. 7.)

The following are extracts from despatches forwarded to the Admiralty by Admiral Moresby, by which it will be seen that the quantity estimated from the examination made by Mr. M'Intosh, Naval Instructor, is 8,600,000 tons; while the accounts brought by the mail state the present stock to be 25,000,000. Admiral

Moresby, however, is of opinion that the islands will be exhausted of the guano that would pay freight, or be saleable in the English market, in eight or nine years. From the northern or principal island more than one-third of the guano has been removed; the remainder may be divided into three portions and qualities:—

"First, that termed English guano, as formerly alone selected for the English market.

"Secondly, that exported by foreign ships to America and elsewhere.

"Thirdly, inferior guano, reserved for the coast trade.

"Of the first quality there remains on the north island about 3,500,000 tons; of the second, about 1,500,000 tons; of inferior, about 500,000 tons.

"I have no *data* on which to report the shipment of guano in 1852, but I have ascertained that within the last eight months about 300,000 tons of guano have been shipped from the north island. A loss of 12 per cent. occurs from the rude manner of its working and conveyance, daily observed in the dense cloud of pulverized guano blown seaward, and correctly ascertained by the shipping dockets at the centre island. I enclose a statement of that shipped in 1850 and 1851:—

"*A Statement of the Quantities of Guano exported from the Chincha islands during the Years* 1850-1851.

In British ships.	Register tons.	In foreign ships.	Register tons.	Tons of Guano sent to				Total.	Will yield at the Queen's Beam.
				England.	France.	United States.	China.		
				1850.					
169	88,882	45	13,599	102,421	1,429	14,250	252	118,352	157,800
				1851.					
268	138,197	36	12,456	150,653	—	38,371	—	189,024	252,032*

"There were at the Chincha islands, on our departure, 100 vessels, capable of exporting nearly 100,000 tons of guano. The Americans far exceeded in amount of tonnage. Between the 15th of July and the 24th of September, 1853, there had been loaded, were loading, or waiting their turn to load, 65 American ships, carrying a gross amount of 61,982 tons. Other American ships were daily arriving, and they now take the superior quality.

"On the centre island there may be about 800,000 tons of guano of the first quality, and 700,000 tons of the second. This island is worked entirely by Chinamen; they dig and wheel daily about 1,290 tons, of which 1,100 appear in the shipping dockets. The southern and smallest island has not yet been worked; from its windward position the guano is inferior, and has no great depth.

* * * *

"From the plans and elevations of Mr. M'Intosh, from my personal examination and information, gathered from those on the islands conversant with the working, I am of opinion that, at the present average rate of exportation, the islands would be exhausted of the guano that would pay freight, or be saleable in the English market, in eight or nine years.

"I have the honour to be, Sir, your most obedient servant,

"Fairfax Moresby,

"Rear-Admiral and Commander-in-Chief."

* * * *

	Tons.
"Quantity remaining on northern islands.....	5,500,000
"Ditto on centre island	1,500,000
"Ditto on southern island	1,600,000
Total	8,600,000"

"NOTES OF CONVERSATIONS AND INFORMATION ACQUIRED BY MR. M'INTOSH.

"The mechanical engineer in charge of the excavation on the northern island told me, that since he came, in October, 1852, a space of 450 feet had been cleared into

* Allowing one-third more than the register tonnage.

the deepest cutting, which amounts to 300,000 tons. I have not been able to ascertain the exact present shipments on this island, but, judging from the number of check clerks, labourers, the plant, &c., it may probably be estimated at one-fourth more than the centre island.

"M. Kossuth, the superintendent of the centre island, having allowed me access to his books, I have satisfactorily ascertained that his statement of shipping 1100 tons per day is correct.

"The details of the work are—150 Chinamen, at five tons per day in barrows, and four ship shoots, at 135 tons each day. M. Kossuth further informed me that, when he commenced, in December, 1852, the rail extended 150 feet from the brow of the cliff; and that he has now obtained a distance of 850 feet, in a direct line into the deepest part of the cutting. This statement, on calculation, further proves the foregoing part, as the amount of guano from such an excavation would amount to 240,000 tons, which, in seven months, is at the rate of 1200 tons per day."

In a letter to Admiral Moresby, Mr. M'Intosh states that the examination was necessarily rough and imperfect, but to avoid the possibility of underrating the quantity, he had estimated at the rate of 40 cubic feet per ton, and had allowed a considerable excess on the measurement given by the plans and sections.

COMPOSITION OF OIL OF THYME.

BY M. LALLEMAND.

This oil has been found by the author to contain a large quantity of stearoptene. He has given it the name of *Thymol*. It is crystalline, melts at 108° F., and will remain liquid for a considerable time at the ordinary temperature, a circumstance which may have been the reason why its presence in the oil has hitherto been overlooked. It has no rotatory action on polarized light; in the crystalline state it behaves like other birefractive media. Its composition is expressed by the formula $C_{20}\,H_{14}\,O_2$, differing from the camphor of the Laurinacæ by two atoms of hydrogen.

Thymene, the other constituent of oil of thyme, is isomeric with turpentine (terbine). It does not exert any rotatory action on a ray of polarized light. Its composition is represented by the formula $C_{20}\,H_{16}$.—*Comptes rendus, Sept.*, 1853.

INDESTRUCTIBLE LABELS FOR ACID VESSELS.

Schubert* recommends that the letters should be written with dilute sulphuric acid (one part to six of water), the label dried, and exposed to a moderate heat. By this means the paper is partially carbonized at the part where the acid has been applied, and a label perfectly indestructible by acids is obtained. Care must be taken not to use too much acid, or to apply too high a temperature, or the letters will break away from the unaltered paper. The labels may be rendered more durable by varnishing.

ADULTERATION OF MINERAL NAPHTHA WITH TURPENTINE.

Saladin† states that this adulteration may be easily detected by rubbing a few grains of iodide of potassium and a little water with the suspected naphtha, when if turpentine is present, the water acquires a yellow or even orange-red colour. By this means, $\frac{1}{3}\frac{1}{0}$f turpentine may be detected.

USE OF CHLOROFORM IN A CASE OF POISONING BY STRYCHNINE.

Dr. Mannson‡ reports a case in which a man, aged forty, accidentally took a quantity of strychnine in mistake for morphine. The dose was about one or two grains. In order to alleviate the violent cramps from which the patient suffered he poured about four grammes of chloroform upon a handkerchief and caused him to inhale the vapour. The result was most successful, though to prevent the return of the cramps it was required to keep up the application of chloroform for some hours.

* Würzburger gemeinnützige Wockenschrift, 1853.

† *Journ. d. Chem. Med.*, November, 1852. ‡ *Polytech. Notizblatt.*

MEANS OF REMOVING THE RANCIDITY OF BUTTER.

Wild* recommends that the butter should be kneaded with fresh milk and then with pure water. He states that by this treatment the butter is rendered as fresh and pure in flavour as when recently made. He ascribes this result to the fact that butyric acid, to which the rancid odour and taste are owing, is readily soluble in fresh milk, and is thus removed.

DEATH OF A LADY FROM EATING LOZENGES.

Mr. Carter held an inquest at the Carpenter's Arms, Walcot Square, Lambeth, on the body of Miss Emma Goodman, aged forty-six, a lady of property, residing at 17, Pleasant Place. About three weeks previously deceased sent her sister to Mr. Ball, a Chemist, 77, St. George's Road, for six worm lozenges, for which she paid three-halfpence. She took one a night for four nights in succession, and about three days after her tongue and gums became dreadfully swollen. Medical aid was procured, and medicines were administered, but she died on Tuesday last. Dr. Humble, who attended the deceased, said the lozenges were composed of calomel, and that the deceased had died from mercurial poison. If there was one thing more dangerous than another, it was taking calomel in the shape of a lozenge. It having been proved that Mr. Ball gave no instructions with the lozenges, the coroner and jury commented on his conduct, and a verdict of accidental poisoning was recorded.

CULTIVATION OF ARROWROOT IN NATAL (SOUTHERN AFRICA).

We extract the following from the *South African Commercial Advertiser and Cape Town Mail*, for Oct. 1, 1853 :—

The extraordinary productiveness of this root in the soil of Natal, is illustrated by the fact, that from a plot of less than *half an acre*, on the estate of Mr. Morewood, at Compensation, a quantity of the root or tubers has been taken, weighing twelve thousand seven hundred pounds ; and this crop has been sold for cash, at 1*d.* per pound, being upwards of £50 for less than half an acre ! The prepared arrowroot from this lot has been sold in this town at 1*s.* per pound.

CHAIR OF PHARMACY IN PARIS.

A report from the Minister of Public Instruction recommends the suppression of the chair of Medical Chemistry, left vacant by the death of M. Orfila, and the substitution for it of a chair of Pharmacy, as being of more general utility. An imperial decree approves of the recommendation of the report, creates the chair of Pharmacy so proposed, and appoints to the new chair thus established M. Soubeiran, professor at the superior School of Pharmacy of Paris.

BOOKS RECEIVED.

Hand-Book of Chemistry, Theoretical, Practical, and Technical. By F. A. Abel and C. L. Bloxam. With a Preface by Dr. Hofmann. London: John Churchill, Princes Street, Soho. 1854. 8vo, pp. 724.

Hand-Book of Inorganic Analysis ; *one hundred and twenty-two Examples, illustrating the most important Processes for determining the Elementary Composition of Mineral Substances.* By Frederick Wöhler, Professor of Chemistry in the University of Göttingen. Edited by A. W. Hofmann, Ph.D., F.R.S., &c. London: Walton and Maberly. 1854.

On the Manufacture of large available Crystals of Sulphate of Iodo-Quinine (Herapathite) for Optical Purposes as Artificial Tourmalines. By William Bird Herapath, M.D. Bristol.

Medico-Chirurgical Transactions. Published by the Royal Medical and Chirurgical Society of London. Volume the thirty-sixth. London: Longman, Brown, Green, and Longmans, Paternoster Row. 1853.

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* *Prackt. Univ. Rathgeber.*

TO CORRESPONDENTS.

A Correspondent.—(1.) *Aromatic Vinegar.* ℞ strong acetic acid 16 oz., camphor 1 oz.; when dissolved, add 1 oz. each of essential oils of cloves, lavender, and lemon. Beasley.—(2.) *Acidum Aceticum Camphoratum*, Ph. D. Probably the acetic acid was not of the proper strength, which would account for the failure; it should contain 51 per cent. of real acid.

A. P. S. (London).—*Acidum Nitro-muriaticum Dilutum.* There is no authorized formula. It would be proper to ask the author of the prescription what he means.

G. S. (Penzance).—Probably Peat Charcoal would answer the purpose.

J. S. (Newport, Salop).—(1.) The mixture prepared according to the formula sent would be turbid.—(2.) The Secretary superintends the transmission of the Journals to Members and Associates.

A. B. C. (Barnsley).—"Thomson's Conspectus of the Pharmacopœias." Edition 1845. Price 6*s.* 6*d.*

A Correspondent (Boston).—Pereira's Materia Medica, vol. i., 25*s.*; vol. ii., part i., 17*s.*; vol. ii., part ii., 24*s.*

A. B. (York) inquires (1.) What is *Black Beer?* It is sold in Hull, and said to be imported from Holland.—(2.) Yes.—(3.) Sympathetic Ink. Digest 1 oz. oxide of cobalt, at a gentle heat, with 4 oz. of nitro-muriatic acid till no more is dissolved, then add 1 oz. of common salt and 16 oz. of water. Beasley.

A Subscriber to the Pharmaceutical Journal will find the information required on the manufacture and purification of Glycerine in vol. xiii., No. ii., page 84; and No. iii., page 138.

A. P. S. (Cheltenham).—*Ammoniated Solution of Quinine.* We have not seen any published formula, excepting the following, which appeared in the "Annals of Pharmacy:"—

℞ Quinæ disulphatis, gr. xxxij.
Spiritus tenuoris, ℥iiiss.
Liquoris ammoniæ, ℥ss.

Mix the quinine with the spirit, and add the ammonia, which will at first precipitate the quinine, but afterwards re-dissolve it.

Ignoramus. (London).—We cannot tell what is meant by "nitrotine" in the shop bill from Woolwich.

G. A. (Southampton).—A Chemist and Druggist is a tradesman, not a professional man.

Y. Y. (Sudbury).—*A Member* (London).—*An Assistant* (Liverpool).—The communications will receive attention.

T. S. W. (Bilston).—A Chemist publishing a treatise on Cholera is on delicate ground. We can give no opinion, as we do not profess to understand the subject.

H. P. P. (Tavistock).—An Apprentice, on attaining the age of 21, is legally, although not morally free from his engagement.

J. M. (Taunton).—The professional charge for a qualitative analysis varies according to circumstances. A guinea is an ordinary fee.

J. R. (Longton).—The example is worthy of imitation, and we shall be glad to hear a further report of progress.

C. F. J.—We have not observed the result described. An opinion on the imperfect data furnished would be of no value. Spermaceti oil and sperm oil are the same thing. We know of no means of depriving it of its smell.

H. K. W.—We know of no test for the purity of sperm oil.

R. E.—The separation of water from coal tar would not fit it for the purpose named.

Veritas.—The term "clove pepper" is sometimes used for pimento.

Quinine.—The process for making Syrup of Kinate of Quina will he found at page 155 of vol. iv. of the Journal.

An Apprentice.—Boerhaave's Chemistry is to be got at the book-stalls for a trifle.

Alfred Keene, in our next.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. VIII.—FEBRUARY 1st, 1854.

THE PAST AND PRESENT GRIEVANCES OF THE CHEMISTS AND DRUGGISTS.

For many years the Chemists and Druggists of this country suffered under annoyances and disadvantages before they took any active steps for obtaining redress. They were not recognized by the Legislature as a body politic; they enjoyed no professional status; although many among them were endeavouring by their scientific attainments to keep pace with the times, they were all ranked together as a class of ignorant and unqualified persons, and were subjected to attacks from Apothecaries and others, who looked down upon them as usurpers of functions to which they had no right, and as an inconvenient race who ought to be put down by Act of Parliament.

The remedy was in their own hands, if they had but known how to apply it, or taken counsel together as to the best means of protecting their mutual interests and improving their position; but they were under the bondage of their ruling passion, jealousy, which operated as a repulsive force, prevented the union and co-operation of the members of their body, and thus they continued year after year unorganized and unrepresented, their rights and privileges continually threatened, while they possessed no regular means of defence.

At length, goaded by a series of attacks, they began to rouse themselves from their lethargy, and in the year 1841 vigorous measures were adopted for "uniting all the Chemists and Druggists of Great Britain into *one ostensible, recognized, and independent body*, for protecting their general interests, and for the advancement of Pharmacy, by furnishing such an uniform system of education as should secure to the profession and the public the safest and most efficient administration of medicine."

The first step in the promotion of the undertaking consisted in discarding the "ruling passion" as much as possible, and establishing mutual harmony and confidence among the Members. Social and scientific meetings tended to facilitate this object, and the calm discussion of the circumstances of the case and the proposed organization, led to a conviction that the formation of a permanent Association, comprising all duly qualified Chemists and Druggists, based upon liberal and representative principles, and introducing a regular system of education and examination for future Members, would effect all that was desired. It could scarcely be expected that *all* would unite in a voluntary undertaking of that nature, as experience shows, that in such cases there are always some who wait to see the result before they will give themselves any trouble or incur expense; others are lukewarm, or hostile, or object to some of the regulations, or refuse to co-operate with some of the parties, or shut their eyes and ears, and know nothing about what is going on around them. For this the founders of the Pharmaceutical Society were quite prepared; but they calculated, that even if half, or only a fourth of the total number of Chemists and Druggists should respond to the appeal of the Provisional Committee, a nucleus would be formed, the ultimate success of the Society would be secured, and the rapidity of its progress would depend upon the extent to which it was supported in its infancy. It was also borne in mind, that even if it should not comprise in its ranks a majority of the trade, it would in all probability make up for the numerical deficiency by the influence and professional standing of those whose intelligence and desire to promote the cause of improvement induced them to co-operate. This anticipation has been realized, as the earliest and most zealous supporters of the Society have been the most respectable and established Members of the trade in London and in provincial towns, who appreciated the advantages likely to result from the acquirement of a professional status founded on improved education.

In the first instance the invitations to join the Society were general, and were industriously circulated throughout the country. To every Chemist and Druggist already in business on his own account, to every Assistant and Apprentice, applying for admission before the 1st of July, 1842, the door was open, and all these parties were exempted from the ordeal of an examination. After that date the stringency of the regulations with regard to admission was increased.

The Charter, which was obtained in February, 1843, again opened the door, which had been partially closed, leaving a discretionary power with the Council to make Bye-laws for regulating the admission of Members, and renewed efforts were made to prevail on all Chemists and Druggists in business at that time to come forward and unite with their brethren.

While these exertions were in progress for promoting union, as a means of placing the Society on a broad basis, the Council were not unmindful of the portion of their duties relating to professional qualification. A School of Pharmacy was established, with a view of introducing a system of education suitable for the Pharmaceutist, apart from medical instruction; lectures, reports of meetings, and other scientific papers were periodically circulated among the Members and Associates; and a Board of Examiners was appointed to test the qualifications of those young men who availed themselves of the existing means of improvement.

Through evil report and good report the Society maintained its ground, and acquired strength and influence, from the steady advancement of its proceedings and the general harmony which prevailed among its Members. The old grievances and persecutions were almost forgotten, and the Chemists and Druggists were favourably contrasted with the medical profession, on account of their freedom from those party disputes and petty jealousies which have for many years proved to be an insurmountable obstacle to the progress of medical reform.

The confirmation of the Charter by Act of Parliament, in the year 1852, gave a fresh impetus to the Society, and a last appeal was made to the lukewarm, the blind, the deaf—those who had resisted all previous invitations, ignoring or undervaluing the advantages offered, and who, it was thought, might be induced to take a more serious view of the question when they found that the body which they were invited to join had obtained the sanction of the Legislature.

If all the duly qualified Chemists and Druggists in the kingdom—not including grocers, hucksters, and miscellaneous vendors of drugs, but all those who could produce certificates to the effect that they had been regularly brought up to the business, and were duly qualified for admission—had responded to this final invitation, and *if the Society so constituted had been spared the calamity of internal dissension*, its success would have been complete. The grievances of the Chemists and Druggists would have been at an end. The entire body under the Parliamentary title of Pharmaceutical Chemists being "united into one ostensible, recognized, and independent body," their influence being concentrated, their interests mutual, and having the advantage of a liberal form of self-government on representative principles, their future status and position would have been impregnable, and the Act, although only permissive in its provisions, would have had all the effect of a compulsory enactment. Under such circumstances, a few years would have brought about an entire reformation. Every Assistant and Apprentice would have been obliged to go with the stream—to study and pass the examination—that being the only passport to the rank and position conferred by Parliament on the Pharmaceutical body.

Some of those whose supineness has excluded them from these advantages, are already beginning to perceive their mistake. They find that the appeal of their brethren to the Legislature has not been made in vain, but having taken no part in the movement, they do not participate in the result. They are still unorganized, unrepresented, liable to annoyance and attack; but they have no right to complain. They might have come forward even at the eleventh hour, but they rejected the opportunity; their grievances are unredressed and aggravated in severity by the fact that they are self-imposed.

Under these circumstances we are not surprised at the attempt which is being

made to rally the scattered forces of the Chemists and Druggists, and to form an Association. The motive power in this case differs from that which called the Pharmaceutical Society into existence.

The appeals to Chemists and Druggists on behalf of the Pharmaceutical Society were addressed to their better feelings—to their *esprit de corps*, their ambition to improve the character of their business or profession, their sense of responsibility and desire to maintain the independence, and raise the status of their body. They were urged to lay aside the petty jealousies of the tradesman, and to merge all minor differences in the grand object of uniting for mutual benefit and improvement.

To those whose minds were incapable of appreciating or entering into such sentiments, and who, therefore, took no part or interest in the proceedings, an appeal of an opposite nature is now being made, and a motive power which it was the first object of the Pharmaceutical Society to extinguish, and which has for some years been, comparatively, in a dormant state, is called into activity on behalf of the new Association of Chemists and Druggists.

In the programme of this Association, it is stated as a grievance, that the doors of the Pharmaceutical Society are "virtually closed against the Chemists and Druggists," and that they are thus "unjustly deprived" of their "social position and professional status." They are, therefore, invited to unite and "remedy these evils," by obtaining a certificate of qualification of the new Association of Chemists and Druggists, for the purpose of counteracting the influence of the certificates of the Pharmaceutical Society. The publication of so gross a perversion of facts, obliges us to recapitulate circumstances which are known by most of the Members, although some persons find it convenient to forget them.

It should have been said that a social position and professional status (which they had never enjoyed) were offered them, that they were urged and entreated to participate in these advantages, which they declined, and that it was only when they found others were enjoying that which they had rejected, that they began to complain of the privation.

Jealousy will sometimes stimulate into activity persons whose minds are not susceptible of more worthy motives, but if this stimulus should be instrumental in uniting the Chemists and Druggists into "one ostensible, recognized, and independent body," the fact would be remarkable, as it would exhibit the "green-eyed monster" in the character of a Peacemaker, gathering into the bond of brotherhood those who had rejected the olive-branch.

The success of such an attempt to effect the organization of persons who have shown so decided a disinclination to unite, is very unlikely. The bait held out by way of inducement is cheap registration without examination. *They are told*, that by the payment of one guinea, they will be permanently registered as Life Members, and will, in social position and professional status, be on a par with Pharmaceutical Chemists. Without any efforts to promote education, to advance the art and science of Pharmacy, and to deserve the confidence of the public, they are to acquire this position and status by writing the names of each other in a book as evidence that they are persons who either never had any claim to recognition as Pharmaceutists, or who refused to join the Pharmaceutical Society when their assistance might have been of essential service to the cause they pretend to advocate. The prosecutor of the Pharmaceutical Society is a warm advocate of the proposed Association, and in this respect we give him credit for consistency; for, having carried his hostility to the Society of which he is a Member to the utmost extent that the technicalities of the law will permit, he could not consistently withhold his support from an opposition.

We should not apply the term opposition to other institutions formed for promoting the same objects as the Pharmaceutical Society, such, for example, as the Chemical Society, the Royal College of Chemistry, the Phytological Club and the local associations of Chemists and Druggists at Liverpool, Manchester, Birmingham, Leicester, and other places. We consider such institutions auxiliaries and allies, although entirely distinct. They tend to promote science,

furnish opportunities for instruction, and spread the desire for improvement. In the present instance, it is the avowed intention of the promoters of the new Association to counteract (if they can) the influence of the Pharmaceutical Society, to divert its Members into another channel, to usurp its functions, and to discourage young men from acquiring its diploma, by offering them a pretended certificate of qualification on more easy terms. It is on this ground that we have thought it right to state a few facts, with a view of representing in its true light a counter-movement, the tendency of which ought to be understood, although it is not likely to produce any result beyond that of deluding a few credulous persons.

ESTIMATE OF THE NUMBER OF CHEMISTS AND DRUGGISTS IN THIS KINGDOM.

In the absence of a statistical return we cannot obtain accurate information as to the total number of Chemists and Druggists in the kingdom, but we possess data from which an approximative estimate may be formed.

In the year 1841, by the assistance of several wholesale Druggists, a list was prepared of all whose names could be obtained, classified in the several towns, for the purpose of sending circulars to the whole trade. The total number was about 5000, and of this number between 200 and 300 circulars were returned—the parties not having been found. It was not supposed that this list was complete, but it was believed to comprise a very large majority, including all the principal Chemists in each town.

In the same year the number of persons licensed to sell patent medicines amounted to rather more than 6000. Of these many were grocers, stationers, makers of patent medicines, and other tradesmen not Chemists and Druggists. There is reason to believe that very nearly all the regular Chemists and Druggists take out patent medicine licences, in some cases, although the return of patent medicines sold does not equal the amount of the licence, as it is found necessary in order to accommodate customers and avoid the penalties for selling without a licence. Assuming, however, on one side, that there are some exceptions; and making allowance, on the other, for the licensed persons not Chemists and Druggists, we think it improbable that the total number at that time (1841) exceeded 6000, which is an approximation to the number on the list above mentioned. We have no such list at the present time, but the number of patent medicine vendors for 1852 was 8379 in England, 604 in Scotland; of whom, judging from the relative proportion in places where there are means of ascertaining it, we cannot estimate the Chemists and Druggists at more than 7000.

The number of Members of the Pharmaceutical Society is about 3500, exclusive of several hundreds whose subscriptions have lapsed, but who are eligible for re-admission on payment of arrears and a small fine. The principal Chemists and Druggists in most towns are Members, and among those who have not joined the Society, there are many who occupy a medium position between the regular Chemist and Druggist and general dealer—who rarely, if ever, dispense prescriptions, and are only ranked among Chemists because they sell a few simple drugs and exhibit coloured bottles.

THE RESULT OF THE ARGUMENT ON THE RULE NISI IN THE COURT OF QUEEN'S BENCH.

In another part of this Number will be found a report of the case against the Pharmaceutical Society, in the Court of Queen's Bench. Although the rule has been made absolute, the substantial question between the parties remains where it was. The Registrar is required to make a return of the registers, in compliance with the *mandamus*, which he is prepared to do, in the terms of the Act. This, in fact, he has already done, by his affidavit, which is filed in the Court. This does not decide the question, whether the persons, whose names are on the registers, have been legally elected as Members, and it will be for

the mover in the business, to take such course, as he may be advised, upon the return being made by the Registrar.

The real merits of the case were not discussed, and, therefore, not understood by the Court, and it was admitted by Counsel, on both sides, that the disputed points did not arise out of the arguments on the rule. The answer to the rule *nisi*, having been to the effect that the terms of the Act had been complied with, in regard to the registers, the rule would have been discharged, if no ulterior objection had been made. But this being the case, and a doubt existing on the subject, the rule was made absolute.

THE PUBLICATION OF LECTURES.

The proposal to publish the lectures delivered at the House of the Pharmaceutical Society has been repeatedly discussed and fully considered. The reasons for not publishing the morning lectures have been explained, and, we believe, admitted by most parties to be well founded. Nevertheless, the subject is occasionally renewed, and suggestions are made, with a view of inducing the Council to re-consider it.

The lectures of the Society are of two classes: first, the courses of elementary lectures, designed expressly for the instruction of Students; secondly, lectures on various subjects, containing some novelty either in the matter or in the mode of illustration and arrangement, and addressed to the Members and Associates generally. It has been the practice to publish lectures of the latter description in the Transactions of the Society, and for this purpose they are written and prepared for the press by the lecturers. In the selection of subjects it is the aim and object, if possible, to present to the audience, and subsequently to the readers, information which is not to be met with in ordinary works; or, in the absence of actual novelty (as discoveries in science are not always at command for such occasions), the application of known principles to practical and scientific purposes, the description of Pharmaceutical or Chemical processes, notices of some of the phenomena in vegetable physiology, and other subjects of this nature, arranged and illustrated with a view of elucidating useful branches of knowledge, furnish materials for evening lectures, which are usually adapted for publication.

The lectures delivered to Students in the morning are of a different nature. They comprise what may be termed the alphabet and grammar of the subjects taught, and if reported *verbatim*, would convey much less available information than the text-book, which is in the hands of every Student. They are not intended to advance science by the promulgation of original discoveries or new theories, but to impress upon the mind of the Student, in the most simple and intelligible form, the facts already known and established, and to fix them on his memory by illustrations and experiments. It being the duty of the lecturer to bring the information conveyed to the Student up to the present state of science, he may sometimes have occasion to refer to recent researches and discoveries; but the substance of his lectures consists chiefly of a repetition of that which he repeated last season and the season before, and which every lecturer on the same subject ought to repeat with the requisite illustrations. If it were possible to convey to the mind by the report of a lecture the same impression which is produced by the lecture itself, oral lectures might be dispensed with altogether, and books might be substituted. The fact is, that the lecturer supplies that which cannot be furnished by books; and at the same time the information contained in books is more adapted to the wants of the Student than published lectures would be, unless reduced to the form of treatises or manuals. For example—a lecturer, in describing a process, observes: "You see before you the apparatus;" he points to the several parts, shows how they are adapted, directs attention to the precautions to be taken, and the indications of the process having been carried far enough, and shows the consequences of employing too high a temperature, &c. More than half his description is performed with his hands. The words which supply the

deficiency would, in many cases, in the absence of the apparatus and the manipulation, be unintelligible. But on reference to his Manual of Chemistry, the Student finds the process described and illustrated with woodcuts. By reading that description he derives much more information than he would from reading the words of the lecturer—but this impression is fixed on his memory by seeing the process in operation.

The lecturer on botany illustrates his subject with numerous specimens. Many lectures are devoted to a description of the several parts of the plants of the various classes and orders. He dissects the plant, shows the structure, and illustrates it by diagrams on a large scale. The words uttered, without the illustrations, would convey no information: but let the Student refer to Lindley's *School Botany* (price 5*s.* 6*d.*), and he will find all that a published description can convey on the subjects to which it refers, illustrated with nearly 400 wood-cuts. Lindley's *Vegetable Kingdom* (price 30*s.*) contains above 900 pages, with upwards of 500 wood-cuts. This work comprises much more matter than a complete course of lectures on botany, but it does not afford that which is the chief advantage of a course of lectures; namely, the inspection of the specimens themselves, and the oral description by the lecturer, which deficiency no report or published treatise could supply.

It must be understood, therefore, that lectures for delivery and lectures for publication are entirely distinct; the former are chiefly a verbal description of objects presented to the eye, the latter are nothing more nor less than a treatise or manual. That some lectures are adapted for publication we have already remarked, and the Council will, we believe, continue the arrangements for the delivery of such lectures occasionally with that object; but the elementary lectures delivered in the school would, in the opinion of the Council, be out of place in the Transactions of the Society, as they would occupy space which would be more usefully devoted to other matter; in fact, not only would the entire pages of the Journal be thus occupied, but during the lecture season, the lectures delivered *in each month* would fill from 180 to 200 pages of small print —equal to about four numbers of the Journal. It is not improbable that the substance of them will be published by the professors in the form of manuals for the use of Students.

THE MEDICAL BILL FOR 1854.

The Medical Bill for the present session has been published in the columns of the Medical Journals, and is, in its general principles, similar to its predecessors. If the medical profession were not divided into so many distinct parties, having conflicting interests and opinions, a Medical Bill might have been carried long ago; and even in the present state of the profession a Bill might be carried, if its promoters would be satisfied to introduce a compulsory system of registration without attempting to settle the disputed questions, and to effect impossible amalgamations among the several medical bodies. But the proposal to re-organize the profession, and supersede old institutions, for the purpose of introducing equality of rights and uniformity of qualification, has the effect of placing in antagonism with each other those influential bodies whose united support is required to carry a measure of so comprehensive a nature. Consequently, each Session is ushered in by its Medical Bill, which, like an almanack, merely denotes the known or supposed state of the medical barometer, adding a page to the literature of the country, but producing no more effect on the profession, than an almanack does on the ensuing harvest.

It was confidently asserted last year that the Secretary of State had undertaken to prepare a Bill and carry it through the House, but the usual obstacles frustrated this intention, and it still remains for the parties concerned to agree among themselves before any Secretary of State can help them.

It is now rumoured that the present Bill is likely to come forward under favourable auspices. If it should pass the second reading we shall again advert to the subject, as some of its provisions will require consideration.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL,

Held on the 11th of January, the following letter was read:—

"*To the President and Council of the Pharmaceutical Society.*

"GENTLEMEN,—Having been informed by Mr. Dickinson that, at the last Meeting of the Council, you declined to re-consider the Resolution passed on the 2nd of November respecting me, and also that a determination was expressed by the Council not to proceed with my expulsion from the Society, I beg to state that it only remains for me now to carry out the intention which I have for some time meditated in the event of the Council adopting either of, or both, the above courses, namely, to resign the office which I hold as one of the Board of Examiners, which I hereby respectfully do. Deeply regretting that anything should have arisen to terminate an active participation on my part in the proceedings of the Society,

"I have the honour to be, Gentlemen,

"Your obedient Servant,

"2, *Brook Street, Bond Street,*
"*January* 2, 1854."

"WILLIAM BASTICK.

Resolved, That Mr. Bastick's resignation be accepted.

LIST OF MEMBERS, &c. (*continued*).

JULY.

Ashton-under-Lyne.	Butterworth, Isaac
Battle	Watlock, B. Dawson
Bradford	Blamires, Samuel
Bridgewater	Hurman, John
Brighton	Martin, John Jones
Bristol	Taplin, Joseph
Cardiff	Kernick, Samuel P.
Coleshill	Dale, James
Colnbrook	Jones, Henry
Grantham	Cox, John
Hayle	Crotch, Wm. James
Hitchin	Ransome, William
Lancaster	Wearing, William
Leeds	Longfield, Joseph
	Bell, Thomas
Leicester	Edwards, James
Longpoot	Woodward, William
Liverpool	Coupland, Henry
	Flinn, John James
	Martin, Thomas
	Walker, John
Liverpool	Wilding, William
	Williams, Robert
Malvern	Burrow, John S.
Maidstone	Rogers, William
Manchester	Glasier, Samuel
	Wadsworth, Thos.
Market Harbro'	Bragg, William B.
Marple	Howe, William
Montrose	Reid, John
Neath	Hayman, Alfred
North Shields	Mease, Robert D.
Nottingham	Heddersly, Samuel
Seacombe	Holt, Richard W.
Southampton	Dutton, John
	Funnell, Edward
Stafford	Morson, James
Stamford	Patterson, George
Staleybridge	Brierley, Richard
Weston-Super-Mare.	Maunder, Alexander
York	Fryer, John
	Mulligan, Thos. G.

JANUARY, 1854.

Barnstaple	Gale, Samuel
Birkenhead	Williams, Terrick
Deddington	Hill, Thomas
Dover	Peake, Henry
Honiton	Rogers, Ph.D., J. R.
Leeds	Clayton, John Oates
London	Duchesne, Robert
	Snell, Glanville A.
	Taylor, John
	Wheeler, Christoph.
Manchester	Booth, Alfred
	Walsh, Edward
Market Deep	Holland, William
Northampton	Harris, Wm. Harry
Ryde	Taylor, Richard
Spilsby	Rainey, Edward
Swanage	Penney, William
Walton	James William A.
Watford	Wright, John Thos.
Yarmouth	Steward, Alfred

MAJOR EXAMINATIONS.

*Brett, Edward Northway .....Newbury
*Daines, Thomas .....London
*Tibbs, Frederick .....Sittingbourne

MINOR EXAMINATIONS.

*Christopher, James .....Crickhowell
*Clingau, Wm. Morison ...Edinburgh
*Dixon, William .....London
*Jones, Hugh Lloyd .....Chester
*Lavington, Edwin .....Wells
*Leighton, Thomas .....Edinburgh
*Tessier, William Henry...Sittingbourne
*Thomson, John .....Edinburgh

* Honorary Certificates.

REGISTERED APPRENTICES.

NAMES.	RESIDING WITH	TOWNS
Barber, William	Messrs. Nunn & Co.	Bury St. Edmunds
Crease, James Robertson	Mr. Mackay	Edinburgh
Fairley, Robert	Ditto	Ditto
Ferroulhet, James Henry	Mr. Hewett	Yarmouth
Pratt, James	Mr. Nunn	Bury St. Edmunds

PHYTOLOGICAL CLUB.

The First Annual Meeting of the Phytological Club was held on Wednesday, January 11th, at 17, Bloomsbury Square, Robert Bentley, F.L.S., &c., President, in the Chair.

Donations of Ferns from Mr. Daniel Hanbury, and of Ergotised Grasses, and specimens of *Hymenophyllum Tonbridgense* from Mr. Blyth, were announced.

The following Report was then read by the Secretary:—

In presenting their First Annual Report the Committee have to congratulate the Members upon the flourishing and prosperous condition of the Phytological Club.

The support and countenance it has received prove that the objects for which it was established commend themselves to Pharmaceutists, and that an association of this kind is desirable in connexion with the Pharmaceutical Society.

The objects contemplated at the formation of the Club have been constantly kept in view. The monthly meetings have been regularly held, at which many interesting papers and communications have been read, and instructive discussions taken place upon them. These have been from time to time reported in the Pharmaceutical Journal. A Branch Association has been formed at Worcester, and the Committee hear of others in the course of formation.

The list of Members, which numbers seventy-five, is as large as the most sanguine could expect, when it is considered that the Club has only completed the first year of its existence, and that no great efforts have been made to induce Members to join. The Committee, therefore, confidently believe that during the ensuing year the number of Members will be considerably increased.

The financial condition of the Club is also satisfactory. After the current expenses of the year have been met, a balance of £10 10*s.* 3*d.* remains in the hands of the Treasurer.

The formation of the Herbarium has not been forgotten. 1700 specimens have been presented, 350 of which form the Herbarium of the Club, and will represent about the number of species. 1350 specimens remain in the hands of the Curators for exchange or distribution among the Members. These duplicates will be distributed among those Members who make application for them to the Curators; those who have contributed specimens having a prior claim.

In concluding their Report, the Committee would press on the Members the desirability of enlisting new Members, and of encouraging a spirit of observation and inquiry on subjects of botanical interest. By so doing the practical value of the Club will be increased, and each succeeding Annual Report will afford greater cause for congratulation.

The Report having been unanimously adopted, and the Officers elected for the present year, the meeting adjourned.

The next meeting will take place on Wednesday, February 8th, at 9 P.M.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

A MEETING of this Association was held in the ROYAL INSTITUTION on Friday evening, December 23rd—W. RAWLE, Esq., President, in the Chair—when Mr. Mercer delivered a lecture on "The Fixed Oils used in Pharmacy."

After deseribing the general charaeters of fixed oils and the proximate constituents found in them by Chevreul, Mr. Mercer took six of the oils mostly used in medicine as special subjects for his communication. These were olive, almond, linseed, castor, croton, and cod-liver oils.

The sources, modes of produetion, and physical characters of these oils were deseribed and illustrated by speeimens. Some of the adulterations to which they are subjeet, as met with in commerce, were pointed out, and the means usually adopted for detecting sueh adulterations explained. Mr. Mercer particularly referred to the specific gravities of oils as affording a method of detecting some of the adulterations to which they are subject. Sperm oil in particular is distinguished by its low specifie gravity, as will be seen from the subjoined table:—

Olive oil, flask	.9158	Linseed oil	.9362
Ditto " jar	.9171	Ditto " boiled	.9506
Ditto " fine cask	.9174	Colza oil	.9156
Almond oil	.9214	Composite oil	.9152
Poppy oil	.9254	Sperm oil	.8750
Castor oil	.9674	Southern Whale oil	.9225
Cod-liver oil.....	.9285		

In reference to sperm oil, Mr. Mercer remarked—"In the last number of the Pharmaceutical Journal a correspondent made inquiry for a test of the purity of sperm oil. The *specific gravity* is a very simple and, what can be said of few other oil tests, a very satisfactory and conclusive one. Sperm is the lightest oil in commerce, never having, when pure, a specific gravity higher than .875. I have seen samples of American winter pressed oil with a sp. gr. as low as .850; such samples, however, are rare.

"The oil usually employed as an adulterant of sperm is southern whale oil, which has a sp. gr. of .922, and the oleometer or specific gravity bottle will at once determine the proportion present in a sample of adulterated sperm."

ORIGINAL AND EXTRACTED ARTICLES.

ON THE FEBRIFUGE PROPERTIES OF THE OLIVE (*OLEA EUROPÆA*, L).

BY DANIEL HANBURY.

IN a letter which I have recently received from my friend Mr. Sidney H. Maltass of Smyrna, he draws attention to the value of the leaves of the olive (*Olea Europœa*, L.) as a febrifuge. The passage is so interesting that I shall make no apology for quoting it at length:—

"* * * I may here tell you of a diseovery I made in 1843, which has proved valuable. I was in the island of Mytelene, and at a time when fever and ague of the worst deseription were raging in the island;—in fact, it was so bad that death ensued frequently after a week or ten days. The small quantity of quinine at the druggist's was soon exhausted, and I could procure none to administer to patients. Knowing that biberine and salicine were often used for fever and ague, I turned over in my mind all the bitters I could think of which might prove effectual. Many were poisonous, and I rejected them, then thought of *olive leaves*, and after several trials made on myself, I commenced administering doses of a decoction of the leaves, say two handfuls boiled in a quart of water till evaporation had redueed it to a pint. This I gave in doses of a wine-glassful every three or four hours. Obstinate cases of fever gave way before it; and for many years I have found it more effectual than quinine.

"I have recommended it to our medical men, and although at first they ridiculed the idea, they all use it now. It is a most valuable remedy for the poor in an olive-growing country."

This discovery is the more interesting since it corroborates some observations upon the same subject made in France many years previously.

So early as in the year 1811, M. Cazals, of Agde, pointed out the good effects he had observed produced by the administration of olive leaves in cases of intermittent fever,* and a chemical examination of them (as suggested by M. Cazals) was soon afterwards made by M. Ferrat.†

Favourable results also attended some similar trials made in France by Dr. Bidot, and in Spain by Drs. Béguin and Faure.

In 1828 a more elaborate investigation of the subject was published by Dr. E. Pallas.‡ He states that olive leaves are sometimes employed as a febrifuge by the physicians of Spain, and that during the war in that country in 1808 to 1813, the French *Officiers de Santé* frequently prescribed them as a substitute for cinchona bark. In several cases of intermittent fever in the military hospital at Pampeluna, Dr. Pallas observed marked beneficial effects from the use of the *bark* of the olive administered in the form of an alcoholic extract.

Dr. Pallas analyzed§ the leaves as well as the young bark, and found them to contain, among other less important constituents, a crystallizable substance designated by him *Vauqueline*, and a bitter principle, to which latter he ascribes most of the febrifuge properties of the plant. As the *young* bark contained more of these matters than either the leaves or the *old* bark, he concluded that it was the preferable part for medicinal use.

Vauqueline, according to this author, is a colourless, inodorous solid, having a slightly sweet taste. It crystallizes in micaceous plates, or sometimes in stellate prismatic crystals, which are very soluble in water at all temperatures. It scarcely dissolves in cold alcohol, though readily in boiling alcohol, from which it precipitates as the solution cools. Its aqueous solution imparts a faint blue to reddened litmus paper. Young olive bark afforded Dr. Pallas nearly two per cent. of *Vauqueline*.‖

Of the pharmaceutical preparations of olive bark, the more useful appear to be a tincture and an alcoholic extract. The tincture is recommended to be made by digesting one part of the young bark in eight parts of spirit of wine of sp. gr. .867. It may be administered as *Tinctura cinchonæ*. The dose of the extract is half a drachm diffused through a little water.¶

The varied and independent testimonies in favour of the febrifuge properties of the olive, seem to render it deserving of a more extended investigation, both as to its medicinal and its chemical properties. The *Vauqueline* of Pallas should be re-examined, and its connexion with the crystallizable principles obtainable from allied plants should be studied.

That some therapeutic value does really attach to the bark and leaves of the olive, is supported by the fact that both the lilac (*Syringa vulgaris*, L.) and the ash (*Fraxinus excelsior*, L.), plants of the same natural order, are reputed to possess febrifuge properties, and employed on that account in some parts of the continent.

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* *Bulletin de Pharmacie*, tome iii., p. 83.

† *Ibid.*, tome iii., p. 433.

‡ *Journal Universel des Sciences Médicales*, tome xlix., p. 257.

Recueil de Mémoires de Médecine, de Chirurgie, et de Pharmacie Militaires, vol. xxiii. (1827), p. 152., vol. xxvi. (1829), p. 159.

§ *Recueil*, vol. xxiii., p. 152.

‖ *Vauqueline* would appear to be identical with the substance designated by Landerer *Olivine* (*Turner's Chemistry*, 7th ed., 1842, p. 1125). The latter name is however objectionable, it having been applied to two other bodies, namely, to the olive-green crystalline substance obtained by the action of sulphuric acid on Salicine, and to a variety of the mineral *Chrysolite*.

¶ Chereau in *Journal de Chimie Médicale*, tome iv. (1828), pp. 543—546.

ON AGAR-AGAR AND CEYLON MOSS.

BY P. L. SIMMONDS, ESQ.

Observing in your last number, in a paper by my friend Mr. Archer, descriptive of some of the articles imported during the past year into Liverpool, incidental mention of Agar-Agar and Ceylon moss, I beg to set him right on some errors into which he appears to have fallen in confounding two different algæ, which are evidently separate and distinct species, although they may be imported into commerce as one and the same article. In the east, Agar-Agar and Ceylon moss are obtained from different fuci, although I have not specimens by me for comparison. The following are the descriptions I have given of the two weeds in my work *The Commercial Products of the Vegetable Kingdom*, just out :—

"Agar-agar, a sort of edible sea-weed, or *tripe de roche*, is found growing on the rocks about the eastern islands that are covered by the tide. It is much used for making a kind of jelly, which is highly esteemed both by Europeans and natives for the delicacy of its flavour. The first quality is worth about 30*s.* the picul (133lbs.). An inferior kind is collected on the submerged banks in the neighbourhood of Macassar (Celebes), by the Bajow Laut, or Sea Gipsies. It is also collected on the rocks about the settlement of Singapore, for export to China, where it is much used as a size for stiffening silks and for making jellies. It constitutes the bulk of the cargoes of the Chinese junks on their return voyage. The quantity shipped from Singapore is about 10,000 piculs (12,500 tons) annually.

"Ceylon Moss (*Gracelaria*, or *Gigartina*, *lichenoides*), a small and delicate fucus, is well known for the amylaceous property it possesses, and the large proportion of true starch it furnishes. The fronds are filiform; the filaments much branched, and of a light purple colour. It grows abundantly in the large lake or back-water which extends between Putlam and Calpentyr, Ceylon. It is collected by the natives principally during the south-west monsoon, when it becomes separated by the agitation of the water. The moss is spread on mats and dried in the sun for two or three days. It is then washed several times in fresh water, and again exposed to the sun, which bleaches it, after which it is collected in heaps for exportation.

"Professor O'Shaughnessy has given the best analysis of this moss, which he described under the name of *Fucus amylaceus;* 100 grains weight yielded the following proportions :—

Vegetable jelly	54.50
True starch	15.00
Ligneous fibre	18.00
Sulphate and muriate of soda	6.50
Gum	4.00
Sulphate and phosphate of lime	1.00
Total	99.00

With a trace of wax and iron."

Dr. O'Shaughnessy, in his *Bengal Dispensatory* (Calcutta, 1842), page 668, thus writes of it, the Gigartina lichenoides, or Ceylon moss :—

"I beg leave to forward to you the results of the analysis you requested me to make of the vegetable substance you sent me, under the designation of an 'edible moss,' and which, as far as I can ascertain, has not been described by scientific writers. It is a very small and delicate fucus of white colour, and flattened filiform shape. The longest of the separate individuals in the specimen I received did not exceed two inches from the ciliary processes, corresponding to the root, to the extremities of the ramifications, which were not very numerous or regular. I could not discover any organs of fructification, perhaps owing to the season of the year when the fucus was collected. As it is, however, my chief object at present to contribute to the chemical history of the substance in question, I shall not enter into its description more minutely; but I shall venture, for mere convenience of reference, to apply to it the provisional term of *Fucus amylaceus*, from its remarkable and important peculiarity of containing a large proportion of true starch.

"With regard to the best mode of rendering it available as an article of diet, I made several experiments, which I need not describe minutely, but the results of which afford some useful indications.

"In the first place, from the tendency of pectin or vegetable jelly to form insoluble compounds with saline and earthy bases, it is necessary to steep the fucus for a few hours, in cold rain water, as the first step in its preparation; this removes a large proportion, if not the entire of the sulphate of soda, leaving all the gelatine and starch. It should then be dried by the sun's rays, and ground to a fine powder; I say ground, for cutting, or pounding, however diligently or minutely performed, still leaves the amylaceous globules so mechanically protected and so closely involved in an external sheath of tough ligneous fibre, that scarcely a particle of the starch can be extracted by boiling, even though the decoction is prolonged for several hours. When ground, on the contrary, boiling for twenty-five minutes or half-an-hour dissolves all the starch and gelatine. The solution, while hot, should be passed through muslin or calico, and thus the ligneous fibre is removed. Lastly, the strained fluid should be boiled down till a drop, placed on a cold surface, gelatinizes sufficiently.

"With milk and sugar, and flavoured by lemon-juice or sherry, this substance, when prepared as I direct, would afford the invalid a pleasant article of diet, especially at sea, where other jellies or their materials cannot be so easily preserved.

The true Ceylon moss is purely of coast produce, confined, I believe, to the shores of Ceylon, as remarked in my work, whilst the Agar-Agar is extensively procured about Singapore, the Chinese coasts, and the Eastern Archipelago generally.

5, *Barge Yard, City, Jan.* 18, 1854.

ON THE ADULTERATION OF OILS.

BY F. CRACE CALVERT, ESQ.

In consequence of the large quantity of oils used at the present day for machinery, woollens, &c., many varieties are introduced into the market, and thus much temptation exists to mix, or adulterate, the more expensive of them. Having been at various times called upon to examine samples of oil, I ascertained that the known processes for discovering adulteration were too general in their application to enable me to obtain satisfactory results; to this class belongs the delicate process recommended by Mr. F. Boudet, principally for the detection of drying oils in olive oil, by the action of hyponitric acid; or Mr. Rousseau's diagometer, which is based on the very inferior conducting power of olive oil, as compared with that of others.

For distinguishing one class of oils from another we may adopt Mr. Faure's method, which is founded on the brown or black tinge which fish oils exclusively assume, when a stream of chlorine gas is passed through them; or Mr. Maumené's, by which the drying oils may be distinguished from the non-drying ones, owing to the fact that the latter, when mixed with strong sulphuric acid, give rise to a much higher temperature, and, although Mr. Fehling has endeavoured lately to give more precision to Mr. Maumené's process, yet it is still far from being satisfactory.

There are other processes, the results of which are not sufficiently distinct to be employed with any degree of certainty; such is Mr. Faure's, which consists in adding a given quantity of caustic ammonia to oils, and noticing after they have been mixed the peculiar appearance which the thick white or yellow fluids present; the same may be said of the process proposed by Mr. Heidendreich, with mono-hydrated sulphuric acid, or that of Mr. Deisel, with concentrated nitric acid, for the chemical actions are so violent, that the characteristic colorations, which are at first produced, rapidly disappear in consequence of the destruction of the oils. These facts induced me to examine what would be the action on oils of the above acids when diluted, and the

satisfactory results obtained are described in this paper. The marked colourations produced may be considered as derived from two distinct chemical actions. First, it appears due to certain foreign matters which are dissolved in the oils, and which existed in the substances from which they were extracted; secondly, the diluted acids have, probably, an action on the component parts of the oils themselves, for if caustic soda be added to oils so acted upon, a different result is obtained from that which would occur if no acid had been previously applied; this fact being clearly illustrated with French nut oil, as it gives a semi-saponified fluid mass when caustic soda of sp. gr. 1.340 is alone mixed with it, and a fibrous mass when treated by diluted nitric acid previous to the addition of the alkali.

It may be interesting here to remark, that fish oils have presented distinct reactions from other animal or vegetable oils, consequently, in my opinion, not only has cod-liver oil a different composition to that of other oils, as shown by the researches of Mr. Winckler, but so also probably have sperm and seal oils.

The most difficult part of my researches has been to procure oils the purity of which I could depend on, and to arrive at this object I was obliged, in many instances, to obtain samples from their sources of production on the continent, and even then I took the precaution of ascertaining their degree of purity, by applying to them the various tests which I shall describe further on.

The reason why I employed many reagents is, that the adulterations which occur in commerce are numerous, and that the reactions presented by organic substances, and especially oils, are exceedingly delicate. I would strongly recommend that samples of pure oil be tested comparatively with those suspected of being adulterated, and never to apply only one of the proposed tests, but all those which give characteristic reactions with the oil under examination.

I have great pleasure in acknowledging the intelligence, chemical knowledge, and industry exhibited in these tedious researches by my assistant, Mr. Charles Lowe.

As the reactions presented by the various oils depend upon the special strength and purity of the reagents, not only should great care be taken in their preparation, but also in the exact mode and time required for the chemical action to become apparent. These I have taken care to describe in the case of each reagent.

Solution of Caustic Soda, sp. gr. 1.340.

The reactions given in the following table are obtained by adding one volume of this test-liquor to five volumes of oil, well mixing them, and then heating the mixture to its point of ebullition.

DARK COLOURATIONS.		LIGHT COLOURATIONS.	
Fish Oils.	Vegetable Oils.	Animal Oils.	Vegetable Oils.
Sperm ... } Seal ..... } Cod-liver } Red	Hempseed { Thick brown yellow	Neat's-foot { Dirty yellowish white	Pale rapeseed ... } Poppy ..... } Freneh nut ..... } Sesame ..... } Dirty yellow white
	Linseed ... { Fluid yellow	Lard.....Pinkish white	Castor ..... } India nut (*thick*) } White
			Gallipoli..... } Olive ..... } Yellow

Caustic soda of sp. gr. 1.340 is principally useful to distinguish fish from other animal and vegetable oils, owing to the distinct red colour which the former assumes, and which colouration is so distinct, that one per cent. of fish oil can be detected in any of the others.

This table should also be consulted when the object is not to discover other adulterations, but to distinguish some of the oils; for instance, hempseed oil acquires a brown-yellow colour, and becomes so thick that the vessel which contains it may be inverted without losing any of its contents, whilst linseed oil

assumes a much brighter yellow colour, and remains fluid. India nut oil is characterised by giving a white mass, becoming solid in five minutes after the addition of the alkali, which is also the case with gallipoli and pale rape oils, while the other oils remain fluid.

Although it is probable that the reason why some of the oils acquire on the application of this reagent a mucilaginous appearance, whilst others become stringy or fibrous, is the greater or less facility with which they are saponified; still, I regret that I had not the time to examine this point carefully.

ACTION OF DILUTED SULPHURIC ACID ON OILS.

As this acid, in different degrees of dilution, exerts distinct reactions on the oils that I had at my disposal, and as it may be employed to discover some known commercial adulterations, I shall discuss separately each series of reactions.

Sulphuric Acid of sp. gr. 1.475.

The mode of applying this acid consists in agitating one volume with five volumes of oil until complete admixture, and then allowing the whole to stand for fifteen minutes, when the appearance is taken as the test reaction.

NOT COLOURED.		COLOURED.		
Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Lard...Dirty	India nut Pale rape-seed Poppy Castor	Sperm... } Light red Seal ..... } Cod-liver..Purple	Neat's-foot { Yellow tinge	Olive..... } Green tinge Gallipoli ... } Sesame..... } Linseed .....Green Hempseed { Intense green French nut ...Brownish

The most striking reactions in this table are those presented by hempseed and linseed oils, for the green colouration which they acquire is such, that if they were used to adulterate any of the other oils to the amount of ten per cent., their presence would be indicated by the distinct green tinge they would communicate to the others.

The red colour assumed by the fish oils with this test is also sufficiently marked to enable us to detect them in the proportion of one part in 100 of any other oil, and it is at the point of contact of the oil with the acid, on their being allowed to separate by standing, that the red colour is principally to be noticed.

Sulphuric Acid of sp. gr. 1.530.

Having obtained, by the application of the preceding acid, a certain number of characteristic reactions, I was induced to try the influence of a stronger one, and therefore agitated one volume of it with five volumes of oil, and allowed the mixture to stand five minutes.

LIGHT COLOURATIONS.		MARKED COLOURATIONS.	
Animal.	Vegetable.	Fish.	Vegetable.
Lard.....Dirty white Neat's-foot { Brownish dirty white	Olive ..... { Greenish white Sesame ... { Greenish dirty white India nut.. } Poppy ..... } Dirty white Castor ..... } Pale rape-seed ..... } Pink	Sperm ... } Seal ..... } Red Cod-liver...Purple	Gallipoli ... } Intense French nut } grey Hempseed { Intense green Linseed ... { Dirty green

As hempseed, linseed, fish, gallipoli, and French nut oils are the only ones that assume with the above reagent a decided colouration, they can be discovered in any of the others.

Sulphuric Acid of sp. gr. 1.635.

This acid was used in a similar manner to those above, and the colouration noted after two minutes.

NOT COLOURED.	DISTINCTLY COLOURED.		
Vegetable.	Fish.	Animal.	Vegetable.
Poppy Sesame Castor	Sperm ... } Intense Seal..... } brown Cod-liver }	Lard.....Light brown Neat's-foot.. } Brown	Olive (light) ..... } Hempseed (intense) } Green Linseed..... } Gallipoli..... } Pale rapeseed ..... } Brown Freneh nut ..... } India nut (light) .... }

I wish to draw especial attention to this acid, as it gives distinct and widely differing reactions from those of the former acids. The colourations produced by sulphuric acid sp. gr. 1.635, are so marked, that they may be consulted with great advantage in many cases of adulteration; for example, I have been enabled to detect distinctly ten per cent. of rape seed oil in olive oil, of lard oil in poppy oil, of French nut oil in olive oil, of fish oil in neat's-foot oil.

I was much struck with the increased colouration assumed by some of the oils when treated by sulphuric acid of different strengths; thus I found that gallipoli oil which was white with No. 1 sulphuric acid, becomes brown with No. 3; pale rape oil, which was white with No. 1 acid, gives a pink colour with No. 2, and a brown with No. 3; whilst neat's-foot oil is of a light yellow with No. 1, but becomes brown with No. 3. These results, therefore, clearly show the decomposing action of sulphuric acid on oils, and that an acid of sp. gr. 1.635 is the maximum strength that can be used, for nearly all the oils then begin to carbonize, and their distinct colouration to be destroyed.

ACTION OF NITRIC ACID, OF DIFFERENT STRENGTHS, ON OILS.

For the reasons given in the first part of this memoir, I employed diluted acid, and obtained a series of reactions, some of which will, I hope, prove useful in some special cases of adulteration, and interesting as showing the influence of gradual oxidation on oils.

Nitric Acid of sp. gr. 1.180.

One part of this acid, by measure, was agitated with five parts of oil, and the appearance, after standing five minutes, is described in this table.

NOT COLOURED.			COLOURED.		
Fish.	Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Cod-liver	Lard	India nut Pale rapseed Poppy Castor	Sperm { Slight yellow Seal.....Pink	Neat's-foot } Light yellow	Olive..... } Gallipoli ... } Greenish Hempseed { Dirty green Freneh nut } Sesame (*orange*) } Yellow Linseed .... }

This test is sufficiently delicate to detect distinctly 10 per cent. of hempseed oil in linseed oil, as the mixture assumes the greenish hue so characteristic of the former. Although olive acquires a green colour, still its shade is such that it is easily distinguished from that of hempseed.

Nitric Acid of sp. gr. 1.220.

I employed this stronger acid with the view of increasing the colouration of certain oils, so as to render it sufficiently marked to ascertain the presence of these oils when mixed with others. The proportion of acid used and the time of contact were the same as above.

NOT COLOURED.			COLOURED.		
Fish.	Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Cod-liver	Lard	India nut Pale rapeseed Castor	Sperm — Light yellow Seal — Light red	Neat's-foot — Light yellow	Poppy yellow, French nut, Sesame — Red Olive, Gallipoli — Greenish Hempseed — Greenish dirty brown Linseed — Yellow

The chief characters in the above table are those presented by hempseed, sesame, French nut, poppy, and seal oils, and they are such that they not only may be employed to distinguish them from each other, but are sufficiently delicate to detect their presence when mixed with other oils, in the proportion of 10 per cent.

Nitric Acid of sp. gr. 1.330.

One part of this acid was mixed with five parts of oil, by measure, and remained in contact five minutes.

NOT COLOURED.	COLOURED.		
Vegetable.	Fish.	Animal.	Vegetable.
India nut Pale rapeseed Castor	Sperm, Seal, Cod-liver — Red	Neat's-foot — Light brown Lard — Very slight yellow	Poppy, French nut (dark), Sesame (dark) — Red Olive, Gallipoli — Greenish Hempseed — Greenish dirty brown Linseed — Green, becoming brown

The colourations here described are very marked, and can be employed with advantage to discover several well-known cases of adulteration; for instance, if 10 per cent. of sesame or French nut oil exists in olive oil; but the same proportion of poppy oil cannot be thus detected as the colour produced is not so intense as in the other cases. But if any doubt remained in the mind of the operator, as to whether the adulterating oil was sesame, French nut, or poppy, he would be able to decide it by applying the test described in the next table, where he will find that French nut oil gives a fibrous semi-saponified mass, sesame a fluid one, with a red liquor beneath, and poppy also a fluid mass, but floating on a colourless liquor.

The successive application of nitric acid of sp. gr. 1.330, and of caustic soda of sp. gr. 1.340, can also be successfully applied to detect the following very frequent cases of adulteration; first, that of gallipoli, with fish oils,—as gallipoli oil

assumes no distinct colour with the acid, and gives with soda a mass of a fibrous consistency, whilst fish oils are coloured red, and become mucilaginous with the alkali.

Secondly, that of castor oil with poppy oil, as the former acquires a reddish tinge, and the mass with the alkali loses much of its fibrous appearance.

Thirdly, rapeseed oil, with French nut oil,—as nitric acid imparts to the former a more or less intense red tinge, which an addition of the alkali increases, and renders the semi-saponified mass more fibrous.

The colourations which divers oils assume, under the influence of the three test nitric acids, clearly illustrate the remarks made at the commencement of this paper, that the reason why the chemists who preceded me in these tedious researches had not arrived at satisfactory results in distinguishing oils in their various adulterations, was that the acids they employed were so concentrated that all the distinctive colourations were lost, the oils becoming yellow or orange; but there is no doubt that the above reagents will enhance the value of Mr. F. Boudet's process, as they afford very useful data to specify the special oils mixed with olive oil.

Caustic Soda of sp. gr. 1.340.

The following reactions were obtained on adding ten volumes of this test-liquor to the five volumes of oil which had just been acted upon by one part of nitric acid.

A FIBROUS MASS IS FORMED.		A FLUID MASS IS FORMED.		
Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Neat's-foot...White	Gallipoli ... } White India nut.. } Castor ..... } French nut...Red Hempseed { Light brown	Sperm Seal Cod-liver	Lard	Olive ..... } White Pale rapeseed ..... } Linseed .....Yellowish Poppy (light) .....Red Sesame { Brown liquor beneath } Amber

Having given in a previous paragraph some of the most useful reactions noted in this table, I shall simply call attention to the following mixtures: neat's-foot with rape, gallipoli with poppy, castor with poppy, hempseed with linseed, sperm with French nut, and gallipoli with French nut. It is also necessary here to mention that the brown liquor on which the semi-saponified mass of sesame oil swims, is a very delicate and characteristic reaction.

PHOSPHORIC ACID.

One part by measure of syrupy trihydrated phosphoric acid was agitated with five parts of oil, and gave the following results:—

NOT COLOURED.		COLOURED.	
Animal.	Vegetable.	Fish.	Vegetable.
Lard Neat's-foot	India nut Pale rapeseed Poppy Sesame Castor	Sperm ... } Dark red Seal ..... } Cod-liver }	Olive (slight) ....} Gallipoli (slight) ..... } Green Hempseed ..... } Linseed (brown yellow) } French nut.....Brown yellow

The only reaction to be noticed is the dark red colour rapidly becoming black, which phosphoric acid imparts exclusively to the fish oils, as it enables us to detect one part of these oils in 1000 parts of any other animal or

vegetable oils, and even at this great degree of dilution a distinct colouration is communicated to the mixture.

MIXTURE OF SULPHURIC AND NITRIC ACID.

The results given in the following table are obtained on agitating one part by measure of a mixture of equal volumes of sulphuric acid of sp. gr. 1.845, and nitric acid of sp. gr. 1.330, with five parts of oil, and allowing the whole to stand two minutes.

Fish.	Animal.	Vegetable.
Sperm ... } Dark Seal ..... } brown Cod-liver }	Lard ..... } Brown Neat's-foot (dark) }	Gallipoli ..... } Dark Pale rapeseed ..... } brown French nut..... } Sesame (becoming intense red) } Hempseed (becoming black) ... } Green Linseed (becoming black) ..... } Olive (orange, slight)..... } Poppy (slight) ..... } Yellow India nut (orange, slight)..... White

As three oils remain nearly colourless, viz., those of poppy, olive, and India nut, we are enabled to detect in them the presence of any of the others; and when olive or poppy oils are adulterated with sesame, the green colour at first produced is much more persistent than with sesame alone, consequently it is necessary that the acid and the suspected oil should remain in contact for about ten minutes, in order to obtain the ultimate brownish-red colour of the sesame; in fact, it is so intense that it may be usefully employed to detect this oil when mixed with others.

AQUA REGIA.

In consequence of the results obtained with nitric acid, I was induced to try the action of aqua regia, but I found that when it was made in the ordinary proportions of three volumes of hydrochloric and one of nitric acid, the reactions produced nearly coincided with the last-named acid. I therefore prepared several samples of aqua regia, in which I gradually increased the proportion of hydrochloric acid, and after having tested them, I adopted one composed of twenty-five volumes of hydrochloric acid of sp. gr. 1.155, and one volume of nitric acid of sp. gr. 1.330, and allowed them to stand about five hours; the reactions described in the following table are those which take place when a mixture of five volumes of oil with one of aqua regia is agitated and allowed to stand five minutes.

NOT COLOURED.		COLOURED.		
Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Lard	Olive Gallipoli India nut Pale rapeseed Poppy Castor	Sperm (slight) } Seal... (slight) } Yellow Cod-liver..... }	Neat's-foot... { Slight yellow	French nut } Sesame..... } Yellow Linseed (greenish) } Hempseed.....Greenish

When the facts contained in this table are compared with the preceding ones, we are struck with their uniformity, and are led to infer that no marked action had taken place; but this conclusion is erroneous, as most of them assume a vivid and distinct colouration on the addition of solution of soda of sp. gr. 1.340, as seen in the following table:—

A FIBROUS MASS IS FORMED.		A FLUID MASS IS FORMED.		
Animal.	Vegetable.	Fish.	Animal.	Vegetable.
Neat's-foot — Brownish yellow	Gallipoli (yellowish) — White India nut — White Pale rapeseed (yellowish) — White Castor — Pale rose French nut — Orange Hempseed — Light brown	Sperm — Orange yellow Seal — Orange yellow Cod-liver — Orange yellow	Lard — Pink	Olive — White Poppy — Intense rose Sesame — Orange, with brown liquor beneath Linseed — Orange

The effects described in this table are such that we can discover with facility ten per cent. of a given oil in many cases of adulteration; for example, poppy in rape, olive in gallipoli and India nut, as all of them assume a pale rose colour; but when poppy is mixed with olive or castor oils, there is a decrease in the consistency of the semi-saponified matter.

By the aid of the above reagents we can also ascertain the presence of ten per cent. of French nut in olive or linseed oils, as the semi-saponified mass becomes the more fluid, and the presence of French nut in pale rape, gallipoli, or India nut oils, is recognized in consequence of their white mass acquiring an orange hue; linseed oil is detected in hempseed oil, as it renders the fibrous mass of the latter more mucilaginous.

Sesame oil also gives with this reagent the same reaction as with nitric acid and an alkali, and poppy oil is distinguished from all other oils, by giving, in this case, a semi-saponified mass of a beautiful rose colour.

To give an idea how the above tables are to be used, I shall suppose a sample of rapeseed oil adulterated with one very difficult to discover. I first apply the caustic alkali test, which, on giving a white mass, proves the absence of the fish oils, together with those of hempseed and linseed; and as no distinct reaction is produced by the sample of oil under examination when mixed with the three sulphuric and nitric acids above mentioned, poppy and sesame oils are thrown out as they are reddened, neat's-foot, India nut, castor, olive, and lard oils resting only in the scale of probability. In order to discover which of these is mixed with the suspected oil, I agitate a portion of it first with nitric acid of sp. gr. 1.300, and then with caustic soda, and their mutual action excludes neat's-foot, India nut, and castor oils, as the sample of oil does not give a fluid semi-saponified mass. The absence of olive oil is proved by no green colouration being obtained on the application of syrupy phosphoric acid. As to the presence of lard oil, it is ascertained on caustic soda being added to the oil which has been previously acted on by aq. regia, as the latter gives a fibrous yellowish semi-saponified mass, whilst the former yields a pink fluid one.

In conclusion, I trust that the reagents described in this paper, and the new method of applying successively two of them to any particular oil, will prove useful not only to detect the numerous admixtures of oil we have noticed, but also to trace and determine in a given oil the presence of any other which we have examined, and I give a general table of the preceding reactions, in order to facilitate the detection of any adulteration.

GENERAL TABLE OF REACTIONS,

OILS.	Caustic Soda, Sp. gr. 1.340.	Sulphuric Acid, Sp. gr. 1.475.	Sulphuric Acid, Sp. gr. 1.530.	Sulphuric Acid, Sp. gr. 1.635.	Nitric Acid, Sp. gr. 1.180.	Nitric Acid. Sp. Gr. 1.220.	Nitric Acid, Sp. gr. 1.330. +	Caustic Soda, Sp. gr. 1.340.	Phosphoric Acid, syrupy.	Sulphuric Acid + Nitric Acid.	Aqua Regia. +	Caustic Soda, Sp. gr. 1.340.
Olive	Slight yellow	Green tinge	Greenish white	Light green	Greenish	Greenish	Greenish	Fluid white mass	Slight green	Orange Yellow	.....	Fluid white mass
Gallipoli	ditto	ditto	Grey	Brown	ditto	ditto	ditto	Fibrous ditto	ditto	Dark brown	.....	Fibrous yellowish white mass
India Nut	Thick and white	.....	Dirty white	Light brown	.....	.....	.....	ditto	.....	Orange white	.....	Fibrous white mass
Pale Rapeseed	Dirty yellowish white	.....	Pink	Brown	.....	.....	.....	Fluid ditto	.....	Dark brown	.....	Fibrous yellowish white mass
Poppy	ditto	.....	Dirty white	.....	.....	Orange yellow	Red	Light red fluid mass	.....	Slight yellow	.....	Fluid intense rose coloured mass
French Nut	ditto	Brownish	Grey	Brown	Yellow	Red	Dark red	Fibrous red mass	Brown yellow	Dark brown	Yellow	Fibrous orange mass
Sesame	ditto	Green tinge	Greenish dirty white	.....	Orange yellow	ditto	ditto	Fluid red mass, with brown liquor beneath	.....	Green, becoming intense red	ditto	Fluid orange mass with brown liquor beneath
Castor	White	.....	Dirty white	.....	.....	.....	.....	Fibrous white mass	.....	Brownish red	.....	Fibrous pale rose coloured mass
Hempseed	Thick brownish yellow	Intense green	Intense green	Intense green	Dirty green	Greenish dirty brown	Greenish dirty brown	Fibrous light brown mass	Green	Green, becoming black	Green	Fibrous light brown mass
Linseed	Fluid yellow	Green	Dirty green	Green	Yellow	Yellow	Green, becoming brown	Fluid yellow mass	Brown yellow green	ditto	Greenish yellow	Fluid orange mass
Lard	Pinkish white	Dirty white	Dirty white	Light brown	.....	.....	Very slight yellow	Fluid mass	.....	Brown	.....	Fluid pink mass
Neat's-foot	Dirty yellowish white	Yellow tinge	Brownish dirty white	Brown	Lightyellow	Light yellow	Light brown	Fibrous white mass	.....	Dark brown	Slight yellow	Fibrous brownish yellow mass
Sperm	Dark red	Light red	Red	Intense brown	Slight yellow	ditto	Red	Fluid mass	Dark red	ditto	ditto	Fluid orange yellow mass
Seal	ditto	ditto	ditto	ditto	Pink	Light red	ditto	ditto	ditto	ditto	ditto	ditto
Cod-liver	ditto	Purple	Purple	ditto	.....	.....	ditto	ditto	ditto	ditto	Yellow	ditto

KNOWLEDGE IS POWER.

It would be worse than idle to attempt an illustration of the subject on general grounds, for the axiom bears conviction with it to all who have heard of steam, the telegraph, or any of the triumphs of mechanics which the age affords.

But leaving the ordinary pursuits of science out of the question, it would be quite as useless viewed with regard to medicine. The knowledge of disease is an endless task, for death surprises the most competent, with half his task unlearnt. Strange as it may seem, the unhappy Chemist requires an apology when he dares to study—a suspicious character if he knows a little—worse if he happen to know much.

We have been lately well repaid in looking through a few old books on Pharmacy, with manuscript analyses, and were amused with seeing what ponderous methods were resorted to in simplest cases, or rather cases that are simple now. It would provoke a smile to read the elaborate discussions and no little sermonizing with which these lucubrations are replete. The same facts would be arrived at now with scarcely half the trouble, with the results expressed in half a dozen lines. Analysis is an art no longer confined to a few philosophers, but within the reach of all. Its practice is as rapid as it was slow, clear as it was ambiguous. But yet these rambling details led the way to our present definite and concise expressions. Our ancestors succeeded in proportion as they knew, and were as much in advance of their times as this age is in advance of them.

We wish to remove the subject beyond the reach of theory, to show how far pure abstract knowledge benefits a Chemist in his daily business, and how far not. There are treatises enough already on the elevation and dignity of mind necessarily associated with the pursuit of science; we have to do solely with the shop.

There are three requisites to success, a certain tact to be acquired by time, good common sense, and abstract knowledge. There is no more pitiable object than the unhappy Chemist who expects a course of lectures, and an acquaintance with Botany, Materia Medica, and Pharmacy, to guide him safely in his daily duties. A pleasant dream soon over. To him what a chaos are prescriptions! what confusion are the labels on the bottles! They were printed in the good old days when calomel was not called submuriate, chloride, or by any more scientific name than calomelanos. Then what anomalies present themselves on every side. Syrup of white poppies turns out black; black bottles green; liquid storax solid; aqua lavendulæ is spirit; spiritus salis, acid; vitriol, if white, means zinc; if blue, means copper. Both lead and milk have got their sugar, as well as diabetes. Sulphur and roses have their milk, while antimony can furnish butter, and crab's eyes are as great a fiction as short hours. To complete the scene, in walks a customer, probably a small girl rescued from a parochial charity. "I want a pennorth of oil of bricks, two pennorth oil of swallows, one pennorth oil of peters, and please mother wants to know if it is good for the rheumatism?" Here are articles demanded, and advice required, neither of which the accomplished Chemist is likely to afford. He would give the world if the girl would ask him the theory of bi-basic salts, but she doesn't. This is the first painful experience that scientific skill alone is of no great use and he begins to think the time a little wasted which he bestowed upon his various studies. Never mind, he will soon brighten up, and make the best man yet.

"Just what I always thought," says common sense; "these wonderful refinements and chemical manipulations may suit Faraday; but give me some one who knows his business, and can make pills."

Quite true, in part. Sense will do much in Pharmacy or any other calling. It will teach a Chemist to beware of all elaborate ways of making common things. He has a distrust of all scientific apparatus for making an infusion.

The world in general makes tea by an easy process—the leaves are placed at the bottom, the boiling water poured on the top, which succeeds to admiration. He has an equal fear of concentrations; for he has seen the burnt deposit crusting the sides of the evaporating pan sedulously stirred in—has smelt the volatile principle driven off in clouds—knows the ingenious method with which they are made up to a proper measure, and more than doubts that they represent accurately the original infusions.

Sense advises equally the rejection of all wondrous fac-similes of lemon-juice, which wastes his time, and are a bad substitute when made, leading him to the conclusion that the best way to imitate fresh lemon-juice is to buy fresh lemons.

When he makes a cerate, he leaves the French to clarify and strain and wash it for some days, and makes it in a capacious basin, where he can stir it well—by which two things are gained: the cerate is as white as snow, and is not advertised upon the operator's clothes. If it be a vegetable cerate, which should be green, and fades, sense does not discard but warms it. If he have anything containing gum tarnished by the action of the air, the knowing Chemist steams it, not by a patent scapement, but before the kettle. If his syrups thicken (technically called *roping*), he never mends them up with spirit, but simply makes them with less sugar—a precaution which all foreign Pharmaceutists have adopted long ago. So instances might be suggested without end to show the daily influence of common sense.

But here we stop, for we have reached the limit beyond which neither sense nor tact can go.

The Chemist is not an ordinary tradesman, not even if he choose, for the world will not allow it.

He is surrounded by, and in the constant occupation of dispensing, the wide range of objects directly connected with either chemistry or therapeutics. There may be some particular cases where a great business is supported by its hereditary reputation, so that those engaged in it are not under immediate necessity of being acquainted with recent investigations. Such reputation has been handed down by those who felt the value of that very knowledge without which the best establishments must in time be carried on with limited advantage.

Let us suppose a young beginner; for though we make no pretension to the wisdom of even middle age, the case is too clear to need much demonstration.

He has served seven years' apprenticeship, three years' counter-practice, and then sets up. We do him the justice to suppose that he never despised a school, but, unhappily, never had its opportunities placed within his reach. It is evident that he is at the mercy of those with whom he deals. Drugs are sent in, and taken unexamined, for he has learnt neither Botany nor Materia Medica;—his master told him both were useless. He makes nothing, for he cannot. The physic comes from a wholesale house—the chemicals are purchased; he should, of course, make both himself. New sciences spring up—Photography, for instance. If he *knew* anything, he might branch out and gain himself a name; as it is, he merely understands his business, and buys and sells, and smiles. Worse than all, he has no confidence in himself; for he has always heard the reason given for all imaginable things, "It is the custom of the house;" as if the usage of the shop were a special law in physics. He can no more tell that yellow bark is used instead of pale because it contains double the active principle, than he knows how to make an extemporaneous iodide by adding the iron or zinc, as the case may be, with a little spirit, when it will almost make itself; nor why iodine pills are sent out covered with magnesia, and not starch; nor how to recover syrup of iodide of iron which has turned brown, by adding iron and heating it again; nor yet that the best way to make iodide of lead is from a cold solution.

One word more. Suppose a prosperous career comes to an honourable

termination—for surely the Chemist sometimes hopes his coloured bottles will lead him to a wished-for haven of repose, however distant. Now, at least, there is no regret at having "stock no bankruptcy can ruin." We can picture to ourselves no more enviable position than the retirement of a well-educated Chemist, in possession of the very knowledge that can best be turned to account. Unlike that miserable individual sitting on the Margate pier, and gazing alternately into vacuity or at the steam-boat, he is a rational being, whose faculties have survived his business. Now can be taken up at leisure the studies that daily avocations rendered necessarily imperfect; and if, by good chance, Botany has ever been a delight, a new creation rises up before him, enjoyable and endless. Happily, our sketch is not ideal, nor need we fear to have it doubted; for we have but to mention the name of William Allen, and so leave it.

Yet only last month appeared the announcement of a society professing to elevate the whole range of Chemists, while it leaves them as ignorant as it finds them. The new philosophers have seen the evil of a school; neither the College of Surgeons or Physicians has one. Surely, the hospital is forgotten. With a comprehensive benevolence, all the present generation are to be enrolled, on payment of a fee, hereafter by examination.

The united happy family are to have no quarrels, no legal grievances, and are expected, in a few years' time, to astonish the government. By what modern alchemy the investment of a guinea can "confer a social position and a professional status" the committee will have to show. For ourselves, we cannot imagine what higher claim to respect the Associated Chemists of Great Britain can have than the United Regular Dustmen. The new members will be registered, and so is a paletôt. What was wanted for Chemists and Druggists was a society that not only gave the rights of membership, but offered, on principle, a training, educating, and, consequently, elevating school. With that aim the existing Pharmaceutical Society set out. Its great object was to commence a school, not in Bloomsbury Square alone, but in every town throughout England; and the station of Chemists will never be higher than it is until the original design is carried out universally. The new college once constituted is to admit, as we have mentioned, by examination. Where are the candidates to learn? Science neither grows in the hedges or buds spontaneously in a back shop. The courses at the hospitals are adapted to the profession only; they are useless for a Chemist. Possibly he might get as much as possible for a shilling at the Polytechnic, and let the dear children run about the building, while he improves his mind. But are there no schools conducted by private enterprise? Yes, some; but any student knows how dear. The question is the education of some thousand Chemists; no private enterprise will meet the case. It may be that a higher and better society than the present one may rise, guided by the experience of the past, and carried out on a national scale; but it never will effect anything while it charters but not instructs, and while it sees the Physician gain his skill by having a hospital in which he learns—leaves it to any wandering lecturer or adventurous teacher to work out for its members the acknowledged axiom, "Knowledge is power."

JOSEPH INCE.

31, *Southampton Street, Covent Garden.*

ON THE ALLEGED "SUBSTITUTION" FOR THE "PULVIS FERRI," OR "QUEVENNE'S IRON."

"Audi alteram partem."

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—I have to ask the favour of your insertion of the following observations, which I have curtailed as much as possible, by confining myself to the point at issue, that is to say, the charge of substitution of one substance for another, and I leave your readers and the public to determine how far I am entitled to acquittal.

Those who have the best means of judging, will, I am sure, testify that the practice of my laboratory is sedulously and undeviatingly to attain the utmost accuracy; those who do not, will, I hope, have waited to hear both sides before pronouncing judgment.

I am Sir, your obedient servant,

WM. EAMES HEATHFIELD.

Laboratory, Prince's Square, Finsbury,
23rd January, 1854.

The object to be attained in preparing the "Pulvis Ferri," is to procure it in the purest possible condition, and at the same time, in the minutest state of division, with a view to its easy solubility in the acids of the system. This object was evidently contemplated by the process of MM. Quevenne and Micquelard; but, in order to bring the reduced metal to the slate colour mentioned in scientific works, the heat must be raised to such a degree of incandescence, as causes it to become agglutinated in the tube, and when taken out the metal is so hard, as to require powdering and sifting, before it can be used in medicine; thus obviating the advantages otherwise derivable from the process. Sifted iron filings might answer the purpose equally well, and the troublesome process of the *Dublin Pharmacopœia* might be dispensed with, in favour of the preparation sold in London, as Quesneville's metallic iron, which has the same appearance, and which is to be purchased in this city at about 2*s.* 6*d.* per pound; and I would here ask, how it happens that the preparation which Mr. Morson has sent out, at the price of 4*s.* per ounce, up to the time of this discussion, has been labelled and called by him, "Quesneville's Metallic Iron;" although, in copying his own letter into the journals, he has altered the term to Quevenne? The price of Quevenne's iron in New York is now 16*s.* per pound.

Without referring, more particularly to my own views regarding the colour of minutely divided iron, or to the necessity there appears to be for further investigation into its therapeutic properties, when in different states of aggregation, I merely observe, that in proportion to its minuteness is its tendency to become oxidized; and that when so partially oxidized, it retains the magnetic property of iron, even though no magnetic oxide of iron be present.

In allusion to the paper "On the Substitution of Magnetic Oxide of Iron for Iron in the Metallic state reduced by Hydrogen," I propose to examine the grounds of conclusions adopted by the analysts, whose reports would appear to have sanctioned a charge which, had its author been more jealous of his own reputation and less so of mine, would not have been made; or had he been more ingenuous, would have been withdrawn before this letter could have been in circulation.

I may observe, first, that a metallic iron, which has been kept for some months, and sent about the kingdom exposed to all influences, would not, if it were in a very finely divided state, show much disposition to continue metallic, but would exhibit a tendency to become oxide of iron, in part or entirely.

I will, however, take the analyses as they appear in print, since Mr. Morson states that it is not a question of comparative purity, but of the substitution of one substance for another.

The numerical results recorded by Dr. Gregory tend only to show that a given quantity of oxygen was contained in the substance examined, but do not prove that it existed in the condition of magnetic oxide of iron, much less that one preparation had been substituted for another; nor does he show whether any of the oxygen was acquired by exposure to the air before he received it, but after the iron was reduced in my laboratory or not.

The analyses of Dr. Stenhouse and Mr. Williamson do not afford even numerical evidence on which to determine that it was magnetic oxide of iron.

Dr. Garrod states that it dissolves in acids with but a trace of effervescence, due to the presence of sulphuretted hydrogen; and that its solutions are precipitated black with alkalies.

The presence of sulphuret of iron indicates that the preparation under examination did contain metallic iron, whatever oxidation might have taken place, subsequently, by exposure; and points out that a heat sufficient to produce metallic iron had been used in the process; and, therefore, leads to the conclusion that it had been subjected to the hydrogen process.

The precipitation by alkalies, from the solution of my preparation in sulphuric acid, is green not black; but the solution of magnetic oxide of iron in sulphuric acid is reddish brown, not black. There is, therefore, here no evidence of the presence of magnetic oxide of iron, but, on the contrary, proof that chemical tests do not evidence it.

And here I offer to those distinguished Chemists who have conducted the examinations, my regret, that I am compelled to point out so wide a discrepancy between their results and their conclusions. I have submitted to one of the most accomplished microscopical inquirers in the kingdom some specimens of the "Pulvis Ferri," and I add the result of his criticism:—

From Arthur Farre, Esq., M.D., Cantab., F.R.S., Fellow of the Royal College of Physicians, one of the Physicians to King's College Hospital, late President of the Microscopical Society, &c., &c., &c.

"12, *Hertford Street, May Fair, 9th Jan.*, 1854.

"My Dear Sir,—I have carefully examined with a Ross's compound microscope the several preparations of iron which you sent me, particularly that marked Quevenne's iron, and also magnetic oxide, as well as a sample of nearly pure metallic iron. All of these I find to be black, and the pure metallic iron in a state of very minute sub-division, at least equal to that of the magnetic oxide. I examined also the preparation called Quesneville's Metallic Iron, which I consider to be decidedly coarse in point of sub-division as compared with the others. I felt the more interest in making these examinations, from having witnessed the process of making Quevenne's iron in your laboratory some months ago. I may add, that in a therapeutic point of view, I should decidedly give the preference to those preparations of metallic iron, which exhibit the finer state of sub-division, and therefore I consider the black preparations superior to those usually recommended for their slaty grey colour.

"W. E. Heathfield, Esq.,
"*Princes Square, Finsbury.*"

"I remain, very truly yours,
"Arthur Farre, M.D.

I now desire to state, with unhesitating confidence, and I pass my word for it, that I have not, on any occasion, sent out, or allowed to be sent out, from my Laboratory, any of the pulvis ferri or Quevenne's iron, excepting such as has undergone the process of hydrogen gas, passed over peroxide of iron, at a red heat. Without calling on Mr. Morson to substantiate his charge, or to withdraw an assertion, which he has so unjustly made, I would hope that in future he will examine, with a little more scientific skill, the merits of a scientific case, before he pronounces an opinion, and I would point out to him that had he examined my Quevenne's iron himself, with accuracy, he would have found that the precipitate from its solution in sulphuric acid was *green*, that from magnetic oxide of iron, treated in the same manner, *reddish-brown*, and he would thus have avoided the unenviable position of imputing a fraud to another, and me, the painful necessity of vindicating myself from such a charge.

I offer my apologies for thus trespassing on the pages of your journal, and am, Sir, your most obedient servant,

Wm. Eames Heathfied.

Laboratory, Prince's Square, Finsbury,
23rd January, 1854.

[We commend the advice of our correspondent with regard to the precautions which should be taken by a manufacturer before "imputing fraud to another." If he had acted in accordance with the principles thus laid down we might have been spared the necessity of publishing in *extenso* last month the correspondence in vindication of the party against whom he had circulated a similar charge.

Dr. Wilson informs us that he intends to send us a communication on the subject for our next number. We trust it will be brief, as the subject has assumed a controversial character, which it is not desirable to protract.—Ed.]

ON THE IMPROVED MANUFACTURE OF CITRIC AND TARTARIC ACIDS, ALONE, OR CONJOINTLY WITH THE MANUFACTURE OF BITARTRATE OF POTASH, TARTRATE OF SODA AND POTASH, NITRATE OF POTASH, BINOXALATE OF POTASH, CARBONATE OF SODA, CARBONATE OF POTASH, AND CERTAIN CITRATES AND TARTRATES.

(*Concluded from page* 322.)

Manufacture of Nitrate of Potash, &c.— Dr. Price's further improvements consist in obtaining salts of potash and tartrates by the decomposition of salts of soda or ammonia and tartrates. For this purpose tartrate of potash and nitrate of soda are decomposed so as to obtain nitrate of potash and tartrate of soda. The tartrate of potash is obtained by neutralizing impure bitartrate of potash, crude argol, or crude tartar, with lime or with carbonate of lime, as at present effected in the manufacture of tartaric acid, and the tartrate of lime separated. Or the tartrate of potash may be obtained by neutralizing crude argol, crude tartar, or impure bitartrate of potash, with sulphide or sulphides of potassium. The sulphide or sulphides of potassium may be obtained by heating sulphate of potash in a reverberatory furnace with small coal or charcoal, until the whole or the greater portion of the sulphate of potash is converted into sulphide of potassium, or may be obtained by other means. The vessel or boiler in which the tartrate of potash is formed may be such as is now employed in the manufacture of tartaric acid, in which the decomposition of the neutral tartrate of potash is effected by means of sulphate of lime, or similar to those vessels in which the crude argol and impure bitartrate of potash is neutralized with carbonate of lime, which vessels may be heated either by means of steam or otherwise. If the sulphuretted hydrogen evolved in the manufacture of the tartrate of potash is to be collected, a close vessel must be employed, having a suitable exit and conduct pipe through which the gas may be conducted. The sulphuretted hydrogen so obtained may be converted into sulphurous acid by burning the same. The solution of tartrate of potash is separated from the insoluble impurities by filtration or decantation.

To the solution of the tartrate of potash contained in any suitable and convenient vessel to which heat may be applied (such, for instance, as an evaporating pan or vessel), nitrate of soda, either in solution or in crystals, is added, in the proportion of 180 parts by weight of nitrate of soda to every 188 parts of bitartrate of potash previously existing in the impure bitartrate of potash, crude argol, or crude tartar, and now existing as tartrate of potash. The solution thus obtained is evaporated to about sp. gr. 1.500 at 212° F., and allowed to cool down to 60° F. or 70° F., when the nitrate of potash will crystallize out. The mother-liquors are now to be withdrawn, and allowed to remain undisturbed, in order that the tartrate of soda may crystallize. The crystals of tartrate of soda being separated, the mother-liquors are to be evaporated to about sp. gr. 1.500 at 212° F., and then, as before, allowed to cool to about 60° or 70° F., when the nitrate of potash will crystallize out. The mother-liquor is then to be set aside, in order that it may deposit crystals of tartrate of soda, and having separated them from any solution remaining, the said solution may be further concentrated, or may be mixed with the mother-liquors resulting from a subsequent operation. Any nitrate of potash remaining with the tartrate of soda may be separated by dissolving the same in hot or cold water, and evaporating until the solution attains to about sp. gr. 1.500 at 212° F., and crystallizing out the nitrate of potash by allowing the solution to cool, and proceeding with the mother-liquors as before directed. The tartrate of soda, thus obtained, may be decomposed with sulphate of lime in the same manner as tartrate of potash is now decomposed by means of sulphate of lime in the manufacture of tartaric acid., viz., by boiling a solution of the said tartrate of soda with sulphate of lime until the whole of the tartaric acid has been converted into tartrate of lime, and the soda into sulphate of soda. The tartrate of lime is to be separated, and the solution containing sulphate of soda is to be evaporated down, in order to afford a useful product, sulphate of soda. 172 parts by weight of sulphate of lime are to be employed for every 188 parts by weight of bitartrate of potash previously existing in the impure bitartrate of potash.

Or, nitrate of potash may be obtained from crude bitartrate of potash, argols, and tartars, by neutralizing or saturating bitartrate of potash with a solution of sulphide

or sulphides of potassium in the manner before described, forming soluble tartrate of potash. The said solution of tartrate of potash thus obtained, is separated by filtration or decantation from the impurities existing in the argols, tartars, or impure bitartrate of potash, and nitrate of soda in the proportion of 94 parts by weight of the crystallized salt, is to be added for every 188 parts by weight of bitartrate of potash originally contained in the impure bitartrate of potash, and now existing in solution as tartrate of potash. The solution is concentrated to about sp. gr. 1.300 at 212° F., and allowed to cool to about 60° or 70° F., when nitrate of potash will separate; after withdrawing the solution and evaporating to about sp. gr. 1.400 at 212° F., tartrate of potash and soda will crystallize out. The mother-liquors after separation are to be concentrated to sp. gr. 1.400 at 212° F., and the remaining nitrate of potash and tartrate of potash and soda separated by crystallization. Nitrate of potash, thus obtained, will contain a small amount of tartrate of potash and soda and impurities, from which it may be separated by re-crystallization, or the tartrates may be decomposed with nitrate or sulphate of lime or chloride of calcium, and the resulting chloride of sodium, sulphate or nitrate of soda separated by crystallization in a manner similar to that now adopted for refining saltpetre.

Nitrate of potash may also be obtained from tartrate of soda and potash by dissolving the same in water in a convenient vessel in the proportion of 300 parts by weight of crystallized tartrate of potash and soda, and adding to the same 90 parts by weight of crystallized nitrate of soda. The solution is concentrated by evaporation to about sp. gr. 1.550 at 212° F., and allowed to cool to 60° or 70° F., when nitrate of potash will crystallize out, and on removing the mother-liquor to a suitable and convenient crystallizing vessel, tartrate of soda will crystallize. The mother-liquor may be treated as before described, under the process for obtaining nitrate of potash and tartrate of soda, by decomposing tartrate of potash by means of nitrate of soda, and the nitrate of potash thus obtained, may be purified by crystallization as before mentioned. The tartrate of soda thus obtained, may be decomposed with sulphate of lime as before described, and the solution of sulphate of soda, being separated from the resulting tartrate of lime, may be made an available product.

Nitrate of potash may also be obtained from neutral tartrate of potash, obtained by neutralizing bitartrate of potash, as is now effected in the manufacture of tartaric acid by means of carbonate of lime or lime, and after separating, by filtration and decantation, the tartrate of lime, a solution of tartrate of potash free from any insoluble impurities may be obtained. This solution of tartrate of potash is placed in a suitable vessel, and to it is added nitrate of soda in crystals, or in solution, in the proportion of 90 parts by weight of crystallized nitrate of soda, to every 376 parts by weight of bitartrate of potash previously existing in the argol, tartar, or impure bitartrate of potash. The solution is to be evaporated to about sp. gr. 1.400 at 212° F., and allowed to cool, and the nitrate of potash resulting is separated from the tartrate of potash and soda by crystallization as before described.

Tartrate of soda, and sulphate or muriate of potash, is obtained by decomposing tartrate of potash and soda by means of sulphate of soda or chloride of sodium. Tartrate of potash and soda in solution may be decomposed, so as to obtain either sulphate of potash and tartrate of soda, or chloride of potassium and tartrate of soda, by means of sulphate of soda or chloride of sodium, in the proportion of 71 parts by weight of dry sulphate of soda, and 60 parts by weight of chloride of sodium, to every 300 parts by weight of tartrate of potash and soda, in a manner similar to that described for effecting the decomposition of tartrate of soda and potash with nitrate of soda, and obtaining thereby nitrate of potash and tartrate of soda: the sulphate of potash or chloride of potassium, produced by this decomposition, may be separated from the tartrate of soda by crystallization, and the tartrate of soda may be decomposed as before mentioned with sulphate of lime, the resulting tartrate of lime being separated from the solution containing sulphate of soda, is employed in the manufacture of tartaric acid as before mentioned, and the sulphate of soda resulting is obtained by evaporation and crystallization.

Tartrate of potash may also be decomposed with nitrate of ammonia, so as to produce nitrate of potash and tartrate of ammonia. This is effected in the following manner:—A solution of tartrate of potash is placed in a suitable vessel, and 160 parts by weight of nitrate of ammonia added to every 150 parts by weight of tartaric

acid existing in solution in combination as tartrate of potash. The solution is evaporated to sp. gr. 1.500 at 212° F. and allowed to cool, when nitrate of potash will crystallize out. The mother-liquors being removed, the nitrate of potash and tartrate of ammonia may be separated in the following manner :—The mother-liquors are placed in a convenient distillatory apparatus, and 60 parts by weight of caustic lime made into milk of lime, or 100 parts by weight of carbonate of lime are added to every 150 parts by weight of tartaric acid existing in solution as tartrate of ammonia, and heat being applied, the volatile ammoniacal compounds are distilled off, which may be employed as before described for neutralizing fresh portions of impure bitartrate of potash. The tartrate of lime thus produced, is separated, and the solution containing nitrate of potash is to be evaporated and crystallized. The tartrate of lime may be decomposed by means of sulphuric acid, and tartaric acid obtained therefrom in the usual way.

The nitrate of lime employed in the processes above mentioned, may be obtained, by decomposing 85 parts of nitrate of soda dissolved in water, with 56 parts of chloride of calcium dissolved either in water or in the solution containing the nitrate of soda; the solution of these salts contained in any suitable vessel, is to be concentrated by evaporation, and the chloride of sodium, which deposits, is to be separated, by raking out the same as deposited. The solution having obtained a density of about sp. gr, 2.500 at 212° F., and after having separated by decantation the chloride of sodium deposited, the solution is allowed to cool, when nitrate of lime will crystallize out. The mother-liquor resulting is to be concentrated, and the chloride of sodium, which is deposited in concentration, is to be separated as before mentioned. The said concentrated mother-liquors are allowed to cool, when nitrate of lime will crystallize out; the mother-liquors resulting are to be treated as before described. The nitrate of lime thus obtained, is to be re-crystallized, in order to separate any chloride of sodium that may remain mixed therewith, or may be directly employed for decomposing tartrate of potash as before mentioned.

The nitrate of baryta, employed in the before mentioned processes, may be obtained by dissolving 85 parts of nitrate of soda and 104 parts of chloride of barium in water, evaporating until a deposition of chloride of sodium takes place; the solution is separated by filtration or decantation, and allowed to crystallize ; the nitrate of baryta is separated, and the mother-liquor, containing chloride of sodium and nitrate of baryta is further concentrated by evaporation, the deposited chloride of sodium is separated, and the filtered solution of nitrate of baryta allowed to crystallize. The mother-liquors are to be further concentrated, and the nitrate of baryta obtained by crystallization. The nitrate of baryta thus obtained, is dissolved in water, and to every 130 parts of crystals of nitrate of baryta dissolved, 186 parts of sulphate of lime are to be added, and the solution of nitrate of baryta, holding in suspension the sulphate of lime, is to be heated, until the baryta is precipitated as sulphate of baryta, when the solution will contain nitrate of lime: nitrate of baryta and nitrate of lime thus obtained, may be employed for decomposing tartrate of potash or citrate of potash as before mentioned.

Nitrate of potash may be obtained by decomposing tartrate of potash and ammonia by means of nitrate of soda in the following manner:—A solution of tartrate of potash and ammonia having been obtained, either as before described or otherwise, nitrate of soda is added, in the proportion of 45 parts of crystallized nitrate of soda to every 188 parts of bitartrate of potash existing in the argol, tartar, or impure bitartrate of potash: the solution is concentrated to about sp. gr. 1.400 at 212° F., taking care that the solution be kept alkaline, by the addition from time to time of either distilled gas-liquor or ammonia, or volatile ammoniacal salts; the nitrate of potash will, on the solution being allowed to cool, crystallize out, and the solution, containing the tartrate of soda and potash and tartrate of ammonia is withdrawn, and the tartrate of ammonia and the tartrate of potash and soda may in part be separated by evaporation and crystallization, care being taken that during evaporation the said solution be kept alkaline. The solution containing tartrate of ammonia with tartrate of soda and potash and nitrate of potash, may either be concentrated to about sp. gr. 1.400 at 212° F., care being taken that the said solution be kept alkaline or neutral, when on cooling, a further portion of the nitrate of potash and tartrate of soda and potash may be separated; or the remaining solution may now either be decomposed by heating the same in a distillatory apparatus, with either hydrated caustic lime or carbonate of lime, in the proportion of 30 parts of lime mixed

with water and made into milk of lime, or 50 parts of carbonate of lime, powdered, and made into a paste with water, to every 188 parts of bitartrate of potash previously existing in the impure bitartrate of potash, and now existing in solution as tartrate of ammonia. The ammonia, or volatile alkaline salts thereof which distil over, may be collected, and employed for converting another portion of impure bitartrate of potash into tartrate of potash and ammonia. The resulting tartrate of lime, may, after separation, be employed in the manufacture of tartaric acid. The solution remaining in the distillatory apparatus, containing nitrate of potash and tartrate of potash and soda, together with a solution of the tartrate of potash and soda and nitrate of potash which had previously crystallized together, may be separated by evaporation and crystallization, and nitrate of potash and tartrate of potash and soda may be obtained. In lieu of employing nitrate of soda to decompose tartrate of potash and ammonia, chloride of sodium or sulphate of soda may be employed, in the proportion of 30 parts by weight of chloride of sodium, or 36 parts by weight of dry sulphate of soda for every 188 parts by weight of bitartrate of potash previously existing in the impure bitartrate of potash, crude argol, or crude tartar, and now existing in solution as tartrate of potash and ammonia. The decomposition, and the several processes, are to be conducted in a manner similar to that above described for obtaining nitrate of potash and tartrate of potash and soda, by decomposing tartrate of potash and ammonia by means of nitrate of soda; chloride of potassium, and tartrate of potash and soda, or sulphate of potash and tartrate of potash and soda are obtained. The tartrate of lime, obtained in either of these processes, may, after having been washed with cold water, be decomposed with sulphuric acid, in the same manner as tartrate of lime is now decomposed in the manufacture of tartaric acid, and the tartaric acid may be obtained by evaporating and crystallizing the solution.

Having decomposed tartrate of potash and ammonia by heating the same in a suitable distillatory apparatus, with hydrated caustic lime, carbonate of lime, or with sulphides of calcium, or with sulphides of barium or strontium, as mentioned under the process for manufacturing tartaric acid, the tartrate of potash remaining after the separation of the tartrate of lime, tartrate of strontia, or tartrate of baryta is to be decomposed with nitrate of soda, in such proportions, that nitrate of potash and tartrate of soda, or tartrate of potash and soda and nitrate of potash be obtained. The decomposition is to be effected in a similar manner to, and by the employment of the same proportions of nitrate of soda and tartrate of potash, as described under the process for obtaining nitrate of potash and tartrate of soda from nitrate of soda and tartrate of potash; and also for obtaining tartrate of potash and soda and nitrate of potash by decomposing tartrate of potash with nitrate of soda.

RESEARCHES ON THE CINCHONA ALKALOIDS.

BY L. PASTEUR.

It is now about half a century since *cinchonine*, whose existence had been previously pointed out by Dr. Duncan, of Edinburgh, was first isolated and obtained in a state of purity, by Gomez, a physician of Lisbon. He attributed the efficacy of cinchona barks to the presence of this body; but he failed to recognize its alkaline character, which, indeed, was not fully appreciated till towards the year 1820, by Pelletier and Caventou, at which time the same Chemists likewise made the important discovery of *quinine*. About twelve years later, two other French Chemists, MM. Henry and Delondre, discovered, in yellow cinchona bark, a third alkaloid, to which they gave the name of *quinidine*. In 1829, Sertürner, already celebrated by his discovery of morphine, observed in the mother-liquors of sulphate of quinine an uncrystallizable base, which he called *quinoidine*, and to which he attributed wonderful febrifuge properties.

The general characters of quinine and cinchonine are sufficiently well known; but with regard to quinidine and quinoidine, very contradictory opinions still prevail. I think that I have removed all these difficulties. The results of my investigations likewise exhibit entirely new molecular relations between the several cinchona alkaloids. The following are the new facts which I have discovered:—

1. *Cinchonicine.*—When cinchonine, in any of its salts, is subjected to the action of heat, it becomes transformed into a new base isomeric with it, but possessing totally

different characters. This new base I call *cinchonicine*. Any salt of cinchonine may be used for the preparation of cinchonicine; but to render the transformation easy and complete, and prevent it from going too far, the salt of cinchonine must be placed under certain conditions. In general, when a cinchonine salt is heated, it immediately melts and decomposes; and if, by any particular artifice, we cause it to melt at a temperature considerably below that at which it decomposes, cinchonicine is produced; but if the heat be too strong, the new alkali is destroyed. Ordinary sulphate of cinchonine, for example, when directly heated, melts, and then immediately suffers decomposition, and is converted into a resinous substance of a fine red colour, which is a product of the transformation of the cinchonine. But if the sulphate, before it is heated, be mixed with a small quantity of water and sulphuric acid, it remains melted at a low temperature, even after all the water has been expelled, and if it be kept in this state for three or four hours, between 120° and 130°, it changes completely into sulphate of cinchonicine. The quantity of colouring matter formed is extremely small, indeed almost imponderable.

I prove, by facts which will be admitted by all Chemists, that though heat plays an important part in this transformation of cinchonine, the vitreous, resinoidal state of the product has nevertheless a real influence upon it; and that the isomerism of this base with cinchonine is due to transformations of the same kind that we meet with so frequently in Mineral Chemistry, as in soft sulphur, red phosphorus, and vitreous arsenious acid.

2. *Quinicine.*—All that has been said about cinchonine is applicable word for word to the salts of quinine. When any salt of this base is heated, a new alkaloid is formed, isomeric with it. The conditions necessary and sufficient for ensuring this transformation are the same as those above indicated in the case of cinchonine. To the new base I give the name of *quinicine*. The best mode of obtaining it is to add a small quantity of water and sulphuric acid to commercial sulphate of quinine, and apply a moderate heat. The mass remains liquid even after the water has been completely expelled, and by continuing to heat it for four hours in an oil-bath to a temperature between 120° and 130°, the entire mass may be transformed into sulphate of quinicine, an extremely small quantity of colouring matter being formed at the same time.

In their general properties, cinchonicine and quinicine exhibit well-marked resemblances to the isomeric bases from which they are derived. They, moreover, resemble each other in the closest manner. Both are nearly insoluble in water, but very soluble in alcohol, whether absolute or of ordinary strength. Both of them unite readily with carbonic acid, and expel ammonia from its salts at ordinary temperatures. Both are precipitated from their solutions in the form of resinous liquids, just like quinine under certain circumstances. Finally, both of them turn the plane of polarization to the right. They are equally bitter, and possess equal febrifugal powers.

3. *Quinidine.*—Allusion has already been made to the contradictions which are met with in the results of different Chemists who have examined quinidine. All these contradictions may be attributed to a fact which has escaped the notice of former observers — viz. that the name of quinidine has hitherto been applied indiscriminately to two alkaloids which are totally distinct in their physical and chemical properties, and are almost always mixed together in the quinidine of commerce, unless care has been taken to purify it by several successsive crystallizations. Thus, the quinidine discovered in 1833 by Henry and Delondre is totally different from the substance at present known by that name in France and Germany; and the German product often contains a considerable quantity of that which was discovered by Henry and Delondre. The leading characters by which these two alkaloids may be distinguished from one another are the following:—One of them, for which I shall retain the name of quinidine, is hydrated, efflorescent, *isomeric with quinine*, turns the plane of polarization to the right, and, like quinine, acquires a green colour by the successive addition of chlorine and of ammonia. The other base, to which I give the name of *cinchonidine*, is anhydrous, *isomeric with cinchonine*, turns the plane of polarization to the left, and does not exhibit any green colouring under the circumstances just mentioned. It is this alkaloid which is most abundant in the samples at present met with in commerce. By exposing recently crystallized cinchonidine to warm air, it is very easy to see whether it contains any quinidine. All the quinidine crystals effloresce rapidly but without change of form, and separate

with a dull white colour from the crystals of cinchonidine, which retain their transparency. The green colouring by chlorine and ammonia likewise affords a useful test.

It appears, then, that the principal bases contained in cinchona barks are four in number—namely, quinine, quinidine, cinchonine, and cinchonidine.

4. *Action of Heat on Quinidine and Cinchonidine.*—These two bases, when subjected to the action of a moderate heat, undergo exactly the same transformations as quinine and cinchonine—that is to say, *quinidine*, like quinine, is converted into *quinicine*, and *cinchonidine*, like cinchonine, into *cinchonicine*, the conditions necessary for the transformation being exactly the same as those already mentioned.

The molecular relations indicated by these results assume a new character when we compare the rotary powers of the six alkalies. Consider, in the first place, the three isomeric bodies—quinine, quinidine, and quinicine. Quinine turns the plane of polarization to the left, quinidine to the right, and both to a considerable extent. Quinicine also turns it to the right, but very feebly as compared with the other two. Similarly with cinchonine, cinchonidine, and cinchonicine. Cinchonine and cinchonidine turn the plane of polarization, the one to the right, the other to the left, and both to a considerable amount; cinchonicine turns it very slightly to the right. The most rational, or rather the necessary, interpretation of these results appears to be as follows:—The molecule of quinine is double, consisting of two active bodies, one of which turns the plane of polarization considerably to the left, the other very slightly to the right. The latter is stable under the influence of heat, and does not undergo any isomeric transformation; but remaining without alteration in quinicine, gives to that body its feeble power of rotation to the right. The other group, which, on the contrary, is very active, becomes inactive when the quinine is heated, and therefore transformed into quinicine. Quinicine, therefore, is quinine, in which one of the constituent groups has become inactive. Quinicine may also be quinidine, in which one of the constituent groups has become inactive; but in quinidine, this very active group turns the plane to the right, instead of to the left, as in quinine, and is, in the same manner, united with the same feeble and instable group possessing right rotatory power, which remains unaltered in quinicine, and gives to it its feeble rotatory power in that direction. All these observations might be repeated, word for word, with regard to cinchonine, cinchonidine, and cinchonicine, which, in fact, are constituted exactly like their three congeners, for they exhibit precisely the same relations.

5. *Quinoidine.*—This body is always a product of transformation of the cinchona alkalies. It originates in two different ways. It is produced in the preparation of sulphate of quinine, and especially in the American forests, when the woodman, after having stripped the bark from the tree, exposes it to the sun to dry it. The salts of quinine, cinchonine, &c., contained in these barks are then transformed into resinous and colouring matters, which constitute the principal part of the quinoidine of commerce. In fact, when any salt of quinine or cinchonine, either in dilute or concentrated solution, is exposed to the sun, even for a few hours only, it undergoes such a degree of alteration, that the liquid assumes a very deep red-brown colour. Further, this alteration is the same as that which takes place at a high temperature. I am therefore of opinion that in the preparation of quinine, cinchonine, &c., serious loss might be avoided, and the extraction of the alkalies greatly facilitated, if the cinchona barks were protected from light as soon as they are removed from the trees, and kept in the dark while they are drying. The manufacturer of quinine should carefully avoid the action of a strong light.—*Compt. Rend.*, xxxvii., 162, and *Quarterly Journal of the Chemical Society*, October, 1853.

TRANSFORMATION OF THE TWO KINDS OF TARTARIC ACID INTO RACEMIC ACID.
DISCOVERY OF INACTIVE TARTARIC ACID.
NEW METHOD OF SEPARATING RACEMIC ACID INTO THE TWO TARTARIC ACIDS, RIGHT AND LEFT.

BY L. PASTEUR.

If, in examining the isomeric transformations of the alkaloids mentioned in the preceding memoir, we make use of the tartrates of those bases, and continue the action of the heat beyond the point at which cinchonicine and quinicine are formed, the modifying influence then extends to the tartaric acid itself. Thus, tartrate of

cinchonine exposed to a gradually increasing heat, is first converted into tartrate of cinchonicine. But if the heat be continued, the cinchonicine becomes altered; it loses water, becomes coloured, and changes into quinoidine. At the same time, the tartaric acid likewise undergoes important modifications; and after five or six hours' exposure to a temperature of 170°, part of it is found to be converted into racemic acid. The tube must then be broken, the black resinous mass contained in it repeatedly treated with boiling water, the liquid filtered when cold, and mixed with excess of chloride of calcium. The whole of the racemic acid is then completely precipitated in the form of racemate of lime, whence it is easy to obtain the racemic acid itself.

The principal use of the cinchonine in this operation is to impart a certain degree of stability to the tartaric acid, and enable it to bear, without destruction, a temperature which would alter it rapidly if it were in the free state. The transformation of the tartaric acid does not in any way depend upon the action exerted by cinchonine and cinchonicine upon polarized light. Tartaric ether—a compound in which tartaric acid is united to a substance which has no action on polarized light, but which can support a high temperature without destruction—yields, when subjected to the action of heat, a considerable quantity of racemic acid.

Racemic acid, thus artificially formed, is perfectly identical in all its physical and chemical properties with natural racemic acid. It possesses, in particular, this important character, of being resolvable into dextro-tartaric and lævo-tartaric acid, exhibiting equal and opposite rotatory powers in their combinations with bases.

This resolution of artificial racemic into dextro and lævo-tartaric acids, leads to this consequence: that ordinary dextro-tartaric acid may be artificially transformed into its opposite—viz., lævo-tartaric acid; a consequence which is highly remarkable, especially when viewed in connexion with the extraordinary fact, which will doubtless be explained at some future time, that we have never, by starting from an inactive body of any kind whatever, succeeded in producing a substance which acts upon polarized light; whereas nearly all the substances elaborated by nature in the vegetable organism are unsymmetrical, like tartaric acid.

This transformation of dextro-tartaric acid into racemic acid is rendered still more remarkable by the fact that lævo-tartaric acid may be converted into racemic acid under precisely similar circumstances. What a strange aptitude is revealed by these natural organic compounds! A group of unsymmetrical molecules, right and left, are, by the sole influence of a high temperature, half transformed into molecules of an opposite character, which, as soon as they are formed, unite with the former.

For a long time I regarded the production of racemic acid from tartaric acid as impossible. To this conclusion I was led by the following considerations:—Racemic acid is a compound of dextro and lævo-tartaric acids. The problem of transforming dextro-tartaric into racemic acid is the same as that of converting dextro-tartaric acid into lævo-tartaric. Now, all that can be done with the one acid may be done, under the same circumstances, with its opposite. If, therefore, any particular operation performed on the dextro-tartaric acid, converts it into lævo-tartaric, the same process applied to the latter should convert it into the former. The transformation appears, therefore, to be impossible. The utmost that we can hope to effect is the production of an inactive acid.

Happily, however, experiment has shown that these theoretical deductions were erroneous. Nevertheless, they have served me as a guide; and the less I was disposed to look for the transformation of tartaric acid into racemic, the more did I multiply my endeavours to discover inactive tartaric acid. Not only did the existence of this latter appear possible from theoretical considerations, I was, moreover, aware of the intimate relation between tartaric and malic acid; and I had previously obtained inactive malic acid. Now, it was in looking for inactive tartaric acid, that I arrived at the formation of racemic acid. But, what is very remarkable—the very same operation yielded also considerable quantities of inactive tartaric acid. In other words, I obtained, together with racemic acid, a kind of tartaric acid which has no action whatever on polarized light, and is not resolvable, under the same circumstances as racemic acid, into dextro and lævo-tartaric acid. This inactive tartaric acid is extremely curious; it crystallizes perfectly, and yields salts, which, for beauty of form, are not inferior either to the tartrates or to the racemates. I have already observed that, after treating with water the tartrate of cinchonine which had been heated for several hours to 170°, and adding chloride of calcium, the

racemic acid, formed at the expense of the tartaric, is precipitated in the form of racemate of lime. If now the liquid be immediately filtered to remove the racemate, and then left at rest for twenty-four hours, an additional crop of crystals is obtained, consisting of pure inactive tartrate of lime, from which it is easy to obtain the inactive acid itself.

Lastly, I have ascertained that the inactive tartaric acid is produced in this operation at the expense of racemic acid previously formed. For if racemate of cinchonine be kept for some hours at 170°, a considerable portion is transformed into this same inactive tartaric acid.

Chemistry is now, therefore, in possession of four kinds of tartaric acid, viz. Dextro-tartaric acid, lævo-tartaric acid, the compound of these two, viz., racemic acid, and the inactive acid, which is neither right nor left, nor formed by the combination of the two. It is common tartaric acid *untwisted* (*détordu*) if I may use this expression, which roughly expresses my idea, and perhaps goes a little further—for we cannot be too cautious in the study of these difficult questions. Doubtless, this series of the four isomeric tartaric acids is a type, to which a large number of analogues will soon be discovered.

A serious difficulty may, however, be apprehended in the application of these new results. Thus, to pass from the right to the left term of the series, it is necessary to pass through racemic acid. Now what process have I given for the decomposition of racemic acid? It consists in the formation of the double racemate of soda and ammonia. The crystals obtained are of two kinds, which must be separated according to their hemihedric forms. In this process, however, there is no generality; the decomposition presents itself as an accident. It is certainly a very curious phenomenon, but we cannot assign any proximate cause for it; moreover, the sodio-ammoniac salt is the only one which exhibits this power of spontaneous decomposition. Hence, it is very probable that in operating on bodies of any other series, we might obtain a substance analogous to racemic acid, but not possessing this power of decomposition, and consequently the inverse of the original compound might remain unknown. Such, indeed, was the state of the question not long ago; but I have recently discovered a process, not mechanical like that of the separation of the two kinds of tartaric acid in the crystals of racemate of soda and ammonia, but chemical, and depending on general principles.

I have, in fact, shown in a memoir presented to the Academy a year ago, that the absolute identity of physical and chemical properties exhibited by right and left *symmetrical* bodies, no longer exists when they are placed in contact with active bodies. Thus the dextro and lævo-tartrates of the same active organic alkali differ altogether from one another in their crystalline forms, solubility, &c. It appeared, therefore, probable, that this dissimilarity might be made available for separating the two tartaric acids by whose union racemic acid is formed; and this result I have actually obtained, after many fruitless trials, by means of the two bases, quinicine and cinchonicine. Thus, in preparing the racemate of cinchonicine, it always happens that when the liquid has attained a certain degree of concentration, the first crop of crystals formed consists almost wholly of lævo-tartrate of cinchonicine, the dextro-tartrate remaining in the mother-liquid. A similar result is obtained with quinicine, excepting that in this case the dextro-tartrate crystallizes out first. Whenever, therefore, an organic compound is suspected to possess a binary constitution analogous to that of racemic acid, its resolution should be attempted by combining it with an active body, which, by the necessary dissimilarity of properties in the compounds which it is capable of forming with the constituents of the complex group, may afford the means of separating them.

We are now, then, in possession of general methods for converting a dextro-compound into its opposite and symmetric lævo-compound, and likewise into the corresponding inactive body.—*Comp. Rend.* xxxvii. 162, and *Quar. Jour. of the Chem. Soc.*

ON THE MANUFACTURE OF LARGE AVAILABLE CRYSTALS OF SULPHATE OF IODO-QUININE (HERAPATHITE)

For Optical Purposes as Artificial Tourmalines.

BY WILLIAM BIRD HERAPATH, M.D., BRISTOL.

HAVING been repeatedly applied to by various parties for the details of my process for the manufacture of these useful crystals, I have been induced to enter into numerous experiments to obtain greater certainty in the results, and to study the conditions necessary for the production of broad foliaceous plates; permit me to make the formula known to science, together with the precautions necessary for adoption to secure the crystals when obtained, and to mount them so as to be available as polarizers or analyzers for the microscope, or even to enable us to perform all the experiments in the polariscope.

The success which I have obtained is so great, that there is no doubt tourmalines and Nichol's prisms will be soon completely superseded by these new crystals, since the scarcity of the one and the difficulty in manufacturing the others render them very costly apparatus. But a little practice in the following process will soon enable any one to make them large enough for every purpose; and so superior are they in power to the best tourmaline, *that two plates scarcely thicker than gold-leaf* may (by a slight modification of my formerly published method) be rendered *totally* impervious to light when they are crossed at right angles.

[Herewith are enclosed two marvellously thin plates of considerable size; one being six-tenths of an inch long and three-tenths of an inch broad, the other the same length but one-tenth of an inch broader. Upon crossing them you will perceive that they are optically perfect as polarizers, and as useful as plates of tourmaline for which you would be charged four guineas each plate. I have succeeded in getting much larger ones by the same process and equally good.]

The materials employed are the same as before, the chief modification being in the proportions of the ingredients, and the care taken in the method of crystallization.

It is necessary to procure pure disulphate of quinine, and for this purpose none approaches so thoroughly to the standard of absolute purity as that manufactured by Messrs. Howard and Kent.

I dissolve it in pyroligneous acid having a specific gravity of 1.042, and dilute the solution with an equal quantity of proof-spirit made by adding rectified spirit of wine, spec. grav. 0.837, to equal bulks of distilled water.

The spirituous solution of iodine is made by dissolving 40 grains of iodine in 1 fluid ounce of rectified spirit of wine.

I can after these explanations give the formula.

Take of disulphate of quinine 50 grains,
" " pyroligneous acid 2 fluid ounces,
" " proof-spirit 2 fluid ounces,
" " spirituous solution of iodine 50 drops;

dissolve the disulphate of quinine in the pyroligneous acid mixed with the spirit; warm the solution to 130° F., and directly add the solution of iodine by drops, agitating the mixture from time to time.

This formula gives to the mother-liquid, after crystallization at 52° F., a specific gravity of 0.986, which appears highly favourable to the deposition of the majority of the crystalline production, and yet allows only the very broad and thinner plates to float—thus getting them *perfectly free* from all interfering and adhering plates.

It is necessary to perform this operation in a *wide-mouthed* Florence flask or matrass, and to take care that the temperature is maintained for a little time after the addition of the iodine, so that the solution should become perfectly clear, dark, sherry-wine colour; then set it aside to crystallize under the following conditions:—

1st. It is essential that the apartment should be tolerably equal in temperature, about 45° or 50° F., as a slight variation in the temperature produces currents in the crystallizing fluid which destroy the parallelism of the crystals, and of course negative all the efficiency of the manufacture; and a greater rise, if only to 60° F., redissolves the thinner plates.

2nd. It is equally necessary that the liquid should be kept in a perfect state of repose during the whole act of crystallization—even the *common vibration* of the apartment must be counteracted, for the same important reason as the last.

The best method to adopt is one which my friend Mr. John Thwaites employs,

namely, to suspend the flask by the neck with strong twine, and attach this to a similar string stretching across from one wall of the apartment to the other. This certainly gives the most uniform results, and offers other advantages.

The plan I had usually employed was to set aside the flask on the steadiest support to be found, a wall, pillar or table; and imbed it on a feather, cotton, or tow pillow, to act as a non-conductor and at the same time destroy vibration.

3rd. It is also necessary that the surface of the fluid should not be exposed to too rapid evaporation, as the temperature would fall too quickly, and various currents and intestinal motions would result; therefore the flask or matrass answers better than the evaporating dish.

4th. It is also decidedly an advantage to have a broad surface in proportion to the depth of liquid; the reason being, that the thinner and most easily reached plates *form on the surface* and float there until the time arrives to remove them; and the greater the surface, the more numerous are the plates.

5th. These broad plates are not always formed; but if after six hours none make their appearance, it is merely necessary to apply a spirit-lamp to the bottom of the flask and warm the liquid to dissolve all the deposited crystals; then add a little spirit and a few more drops of iodine solution, and again wait for crystallization.

6th. Supposing that we obtain a crop of these broad floating plates, which generally occurs under the aforementioned conditions, we permit them to remain from twelve to twenty-four hours to complete their disc and fill up all crevices, &c., and to attain a sufficient degree of thickness; for if too thin, they do not stop the red or purple-violet rays, as Haidinger has beautifully shown and admirably explained (*vide* Phil. Mag. Oct. 1853, and Poggendorff's *Annalen* for June last). If the crystals are allowed to remain too long in their mother-liquid, we run the risk of loss and injury; for after some time a dissolving or disintegrating action appears to occur, and considerable disappointment is occasioned. I have lost several batches of beautiful and magnificent plates from inability to secure them at the nick of time.

Having by these means obtained the object of our best wishes, it now remains to secure the prize. This requires a little patience and a tolerable amount of care; the following plan is the most ready, and requires but little practice and a steady hand to ensure success.

The first stage of the process is to procure a table as near as possible to the crystallizing spot, furnished with the following apparatus :—

1. A gallipot or small mortar to hold the flask on as a support.
2. A supply of perfectly clean circular glass discs, small enough to pass down the neck of the flask with ease.
3. A glass rod of sufficient length to descend to the bottom of the flask if necessary.
4. A little marine glue or sealing-wax.
5. A spirit-lamp and matches.
6. A quantity of blotting-paper cut in strips about an inch wide and two inches long, and also a folded sheet of the same to act as a pad or support.

Now remove the flask with the greatest amount of care from its attachment to the horizontal string; this is best done by holding the perpendicular twine in the left finger and thumb, at the same time cutting the upper end of it with a pair of scissors to avoid all disturbance. It will now swing easily and steadily, and may be carried and gently deposited upon its gallipot support. Then attach the edge of one of the circular glass discs to the end of the glass rod by a little of the wax or marine glue, and let it, when cold, be carried *flatly* down the neck of the flask, which should be very gently inclined, as nearly horizontally as possible, to admit of this being easily accomplished. Having selected the largest crystalline plate, pass the glass circle gently beneath it, raise the plate by depressing the hand, and the little crystalline gem is at once caught on its surface.

If this operation be neatly accomplished, it appears spread out as a thin uniformly-coloured film upon the glass; if any black patches appear, they are occasioned by the accidental crossing of some interposed crystals, or from some on the under surface of the glass disc. These last must be at once wiped off by the blotting-paper, the others will sometimes float out upon raising the edge of the glass disc to a perpendicular position; if they are near the edge, they may sometimes be gently drawn out from under the large crystal by a little dexterity on the part of the operator; frequently there are no such precautions necessary.

Now rapidly dry the plate by imbibing all the fluid most scrupulously by blotting-paper. This must be done without *touching* the crystalline surface, for the least contact destroys its beauty, symmetrical arrangement, and optical usefulness. Having done so, let it dry by exposure to the air in a cool room, say at 40° to 50°; this is to prevent resolution and disintegration of the crystal in its own mother-water, a little of which must remain attached after all our care.

It is sometimes necessary to float them on, or dip them *for an instant* only in a little *cold distilled water* somewhat imbued with iodine. This serves two purposes; it removes all mother-liquid, and prevents those crystals of sulphate of quinine subsequently forming and interfering with the perfect polarization of the new tourmaline, as every crystal of this substance interposed between the plates would of course rotate the polarized beam as far as its influence extended, and *depolarize* it. The iodine acts also in preventing the solution of the new crystals in the water. They must again be dried by imbibition and by exposure to air, as before, and then placed under a cupping-glass, having a watch-glass with a few drops of tincture of iodine in it. This gives a decidedly black tone to the field; and if the crystal were before too thin to obstruct all the light, and thus give a red or purplish violet-tint, its power of polarization will be very materially improved by following the above simple directions.

It is essential in iodizing the plate that the exposure to the vapour be not too long continued; the time necessary will of course depend on the temperature of the apartment, about three hours at 50° F. being generally necessary. The reason of this precaution will be at once evident upon making the experiment, for the crystals assume a rich golden yellow colour, both by reflected and transmitted light; the field will therefore, when the two plates are *parallel*, be intensely yellow, a most objectionable colour for the examination of objects. The crystals have lost the power of stopping the yellow rays, and the complementary relation of the body to the superficial colours appears to be lost also—a very remarkable fact.

The rationale of the periodizing process appears to be the addition of as much iodine to the crystal as will be sufficient to communicate the exact complement of yellow to neutralize the red and blue rays of the purple "body-colour." These rays are now absorbed by the plates as they would be by yellow glass. If too much iodine be added, an intense yellow light becomes transmissible when the crystals are parallel, and the plate becomes rotten and brittle, and will be almost certainly destroyed in mounting, even if it be exposed to the air for some time before attempting to do so, by which process the superadded iodine again volatilizes, clearly showing that no chemical union could have existed.

Having so far prepared the "artificial tourmalines," it merely remains to cover them by another plate of thin microscopic glass, interposing some highly refractive cement or varnish between the two plates.

Several cements offer themselves to our notice, but some selection is necessary. Canada balsam is one of the best; however, in using this it is necessary to have it very fluid, and not to employ much heat in the process; in fact, I believe it best to use it so as to be fluid at the ordinary temperature. I have found, however, that it appears to attack the crystals and dissolve out the iodine; in order to correct this destructive tendency, it is essential to saturate the fluid Canada with iodine at the ordinary temperature. This is best done by warming some small quantity of the balsam in a test-tube or thin bottle and dropping into it some crystals of iodine, agitating them well together by a glass rod; giving time to cool and the excess of iodine to subside, it is fit for use. It is merely necessary to take a small drop of this fluid on the end of a glass rod, place it on the larger and clean glass circular disc, then invert the disc, carrying the crystal upon it, press the two together gently and steadily with the finger or a glass rod, or piece of stick, taking great care not to use much force, in case the circles or crystal may sustain injury. Now remove all the extra Canada balsam from around the edge, and expose the little apparatus to the air so that the balsam may become dry; it is then fit to mount in the brasswork of the microscope in the same manner as a tourmaline.

I have found it best to employ an æthereal solution of Canada balsam in this process, made by dissolving the hard old balsam in washed pure sulphuric æther, afterwards adding a little iodine to it as before. This dries more rapidly, hardens quicker and more perfectly than the usual fluid Canada, and it does not attack the crystals—a very great advantage.

These directions may appear very prolix, tedious, and excessively troublesome; but, however, when set in practice, the whole operation resolves itself into the utmost simplicity, habit soon reconciling one to the routine, and the different precautions appear to offer themselves unconsciously to us as we proceed. I have frequently prepared a dozen good tourmalines in an hour, as far as the catching and drying part of the operation are concerned; the others of course require longer time, but to these we must wait, and occupy ourselves with some other stages of the same process.

There is not the least doubt that before long these splendid and useful crystals will be offered for sale by opticians at as many shillings as tourmalines now cost pounds, and certainly of equal value and practical utility—in my own opinion, of even greater, for less light is lost by these than by any of our polarizing apparatus at present in use.

I have invariably used in this description the original terms employed by me, namely, "artificial tourmalines" and "crystals of sulphate of iodo-quinine." Professor Haidinger's term of "Herapathite" is certainly a highly complimentary one to myself; but as it does not give either an idea as to the optical properties or chemical characters of the substance in question, it does not appear to me so suitable as those I originally attached to them.

32, *Old Market Street, Bristol,*
October, 1853.

THE USE OF COFFEE AS A BEVERAGE CONSIDERED IN A CHEMICAL AND PHYSIOLOGICAL POINT OF VIEW.

BY PROFESSOR LEHMANN.

In the experimental consideration of this subject the author has adopted as a principle, that under a well regulated and uniform diet and mode of life, the quantitative relations of the substances excreted in the urine present a trustworthy view of the general assimilative process in the individual.

He has therefore selected patients whom he considered fit, and while administering to them either coffee or its various constituents separately, has made such regular observations of the urinal excretions as would enable him to infer what is the nature of the efficacy of coffee and of its constituents respectively.

In determining the amount of urea, he has adopted the method recently put forward by Liebig.

The general results of his investigation are:

1. That a decoction of coffee exercises two principal actions upon the organism, which are very diverse in character, viz., increasing the activity of the vascular and nervous system, while at the same time it retards the metamorphosis of plastic constituents.

2. That the influence of coffee upon the vascular and nervous system, its reinvigorating action, and the production of a general sense of cheerfulness and animation is attributable solely to the mutual modification in the specific action of the empyreumatic oil and the caffeine contained in it.

3. That the retardation of the assimilative process brought about by the use of coffee, is owing chiefly to the empyreumatic oil, and is caused by caffeine only when taken in large quantity.

4. That increased action of the heart, trembling, headache, &c., are effects of the caffeine.

5. That the increased activity of the kidneys, relaxation of the bowels, and an increased vigour of mental faculties, passing into congestion, restlessness, and inability to sleep, are effects of the empyreumatic oil.

Professor Lehmann considers it therefore necessary to regard the action of coffee, and in a less degree that of tea, cocoa, alcohol, &c., upon the organism, as constituting an exception to the general law, that increased bodily and mental activity involves increased consumption of plastic material.

He considers that these substances have the capability of rendering the individual insensible of a certain deficiency of food in virtue of their retardation of the assimilative process.

He thinks it probable, likewise, that these substances have a direct nutritive value, especially coffee as drank by the Turks and Arabs with the grounds.

He attributes the rapid increase in the consumption of coffee to an instinctive tendency to provide some remedy for the compulsory use of the potato as food among the lower classes; and in confirmation of this, points to the facts, that the introduction of the potato from the west, and that of coffee (as an article of food) from the east, were simultaneous, and that the increase in their consumption has progressed equally, both as regards amount and locality.

Professor Lehmann considers that the singular preference of one or other of these beverages by particular nations, as well as the eastern custom of drinking coffee with the grounds, are not accidental, but have some deeper reason. This reason he thinks is to be found in the different effects of the coffee, tea, &c., and the various requirements of the nations by whom they are used, and instances the use of tea by the English, and of coffee by the Germans and French, as in accordance with this view. The diet of the former affords a larger supply of plastic material than that of the latter people, and while, consequently, the retardation of the assimilative process is an important influence for the German, the proportionately greater nervous stimulus caused by tea is more desirable for the former.

The use of coffee with its grounds, has its analogue in the use of tea mixed with meal, milk, and butter among the Mongols, and other inhabitants of the central Asiatic steppes.—*Annalen der Chemie und Pharmacie*, September, 1853.

ON THE DRIED COFFEE-LEAF OF SUMATRA,

Which is employed in that and some of the adjacent Islands as a substitute for Tea or for the Coffee-bean.

BY JOHN STENHOUSE, LL.D., F.R.S.

I RECENTLY received from my friend Daniel Hanbury, Esq., a quantity of dried coffee-leaves which had been prepared in Sumatra, under the direction of N. M. Ward, Esq., of Padang.* The sample had a deep brown colour, and consisted of the leaves of the coffee-tree mixed with fragments of the stalks. The leaves had been very strongly roasted in rather a rough manner, and had consequently acquired a slightly empyreumatic odour. In this respect they pretty closely resemble Paraguay tea, the leaves and twigs of the *Ilex paraguayensis*, which is subjected to a somewhat similar process. The coffee-leaves, when digested with boiling water, yielded a deep brown infusion, which in taste and odour closely resembled an infusion of a mixture of coffee and tea. On the addition of milk and sugar, it formed a very tolerable beverage ; and as the roasted coffee-leaf can be imported into Europe for rather less than twopence per pound, the poorer classes are likely to find it a very useful substitute for tea and coffee. Should a more moderate temperature be employed in drying the coffee-leaf, I think its flavour would be greatly improved.

The coffee-leaf, as might almost have been expected, contains the two characteristic constituents of the coffee-bean, viz., theine or caffeine, and caffeic acid. In this respect the coffee-leaf differs essentially from chicory or any of its adulterations, such as roasted turnips, mangelwurzel, carrots, &c., the usual substitutes for coffee, which do not contain a trace of either of these principles.

The theine or caffeine was extracted from the coffee-leaves in the usual way, by precipitating the colouring matter and other impurities, first by acetate and then by subacetate of lead. The acetate of lead threw down a dark brown precipitate containing all the caffeic acid, and the subacetate produced a scanty bright yellow precipitate. The excess of lead was then removed from the clear solution by sulphuretted hydrogen, and the sulphide of lead having been collected by filtration, the theine crystallized when the liquid, after being sufficiently concentrated, had been set aside in a cool place for some days.

The crystals of theine as first obtained were of a brownish colour, but after being strongly pressed between folds of blotting-paper and repeatedly crystallized, they were rendered nearly colourless.

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* See a Paper by Mr. Hanbury in the 13th volume of the *Pharmaceutical Journal*, p. 207.

I. 1000 grains of dried coffee-leaves, when treated in the way just described, yielded 12.5 grains theine=1.25 per cent.

II. 1000 grains of coffee-leaves in a subsequent trial gave 11.54 grains=1.15 per cent.

The amount of nitrogen in the dried coffee-leaves was also determined by Will's method.

1.344 grm. substance gave 0.2005 platinum=2.118 per cent. nitrogen.

0.7775 grm. gave 0.1185 platinum=2.165 per cent.

Now it has been ascertained as the result of numerous experiments,* that "coffee contains from 0.80 to 1 per cent. of theine, and that tea contains 2 per cent. of the same principle." "And the nitrogen in coffee-beans (see page 27 of the same Report) lies between $2\frac{1}{2}$ and 3 per cent."

By a recent determination I found that 1000 grains of a good black tea gave 21.3 grains of theine = 2.13 per cent.

1000 grains of a black tea grown in the East India Company's tea plantations at Kemaon, on the Himalayas, gave 19.7 grains = 1.97 per cent.

0.4705 grm. of the same Kemaon tea gave 0.1175 platinum = 3.5 per cent. nitrogen.

Many years ago I detected the existence of theine in what is called Paraguay tea, the dried leaves and twigs of the *Ilex paraguayensis*, but I neglected to determine its amount. I have recently found that 1000 grains of Paraguay tea yielded 12.3 grains of theine = 1.23 per cent.

III. 1000 grains ditto gave 11 grains = 1.1 per cent.

1.748 grm. gave 0.1865 platinum = 1.51 nitrogen.

1.031 grm. gave 0.123 platinum = 1.70 nitrogen per cent.

From these results it is clear that dried coffee-leaves are somewhat richer in theine than the coffee-bean, and contain, as nearly as may be, the same amount of that principle as Paraguay tea.

From the violent roasting to which the coffee-leaves had been subjected, I feel convinced a portion of their theine has been dissipated; and were they only dried at a moderate temperature, I confidently expect that they would yield $1\frac{1}{2}$ per cent. of theine. The theine obtained from the coffee-leaves was not subjected to analysis. This I considered unnecessary, as it possessed all the well-known properties of ordinary theine, crystallizing in fine silky crystals, which readily sublimed when heated; and when digested with nitric acid and cautiously evaporated to dryness, they gave when treated with ammonia the characteristic red coloration so closely resembling that from uric acid when acted on by the same reagents.

With regard to caffeic acid, the other characteristic proximate principle of coffee, the leaf of the coffee plant contains it also in larger quantity than the berry. Caffeic acid is precipitated of a deep yellow colour by acetate of lead, but is apparently uncrystallizable; at least the numerous attempts which I have made to obtain it in a crystallizable state have hitherto proved unsuccessful. Caffeic acid does not precipitate solutions of gelatine, and it is therefore not a species of tannin, as has been sometimes asserted. The most remarkable property of caffeic acid is that first stated at the 34th page of the joint Report on the adulteration of coffee already quoted. "Caffeic acid appears to be analogous to kinic acid, the acid of cinchona barks, for it yields kinone when oxidated by means of sulphuric acid and binoxide of manganese. To observe this properly, the coffee is boiled with water and a little slaked lime, the infusion filtered and evaporated down to the consistence of a syrup. The syrupy liquid is then mixed in a retort with four times its weight of binoxide of manganese and one part of oil of vitriol diluted with an equal bulk of water. Sufficient heat is produced by the action of the sulphuric acid upon the other materials to bring over the greater portion of the kinone, and the lamp need not be applied till towards the close of the operation. The distillate consists of yellow crystals of kinone, which usually coat the neck and sides of the retort, and a bright yellow liquid, which is a saturated aqueous solution of kinone, with a considerable quantity of formic acid. Kinone is easily discernible by its volatility and peculiarly acrid odour, which greatly resembles that of chlorine. The solution of kinone gives

* See the 32nd page of the "Chemical Report on the Mode of Detecting Vegetable Substances mixed with Coffee, for the purposes of adulteration," drawn up by Professor Graham, Dugald Campbell, Esq., and myself, for the British Government, and communicated to it in December, 1852

with ammonia a sepia black colour. It is decolourized by sulphurous acid. The beautiful green hydrokinone is obtained by exactly neutralizing the solution of the yellow kinone with sulphurous acid, great care being taken not to introduce the latter in excess.

"The peculiar acid in Paraguay tea agrees with caffeic acid, to which it is no doubt related, in yielding kinone to similar oxidizing agencies; so does the acid of the leaves of the common holly, *Ilex aquifolium*, and the whole of the cinchona tribe."

When coffee-leaves are boiled with a considerable quantity of water, and a slight excess of milk of lime, the dark brown strongly alkaline liquor is cautiously evaporated to dryness, and then treated in the way already described, with three times its weight of black oxide of manganese and one part of sulphuric acid, diluted with its own bulk of water, a much larger quantity of crystals of kinone are obtained than can be procured from an equal weight of the coffee-bean. This clearly shows that the leaves are richer in caffeic acid than the beans.

Kinone may, I find, be obtained in small quantity by a similar process from a great number of our commonest plants. Thus I also obtained indications of kinone from the leaves and branches of the privet, *Ligustrum vulgare;* from the common ivy, *Hedera helix*, from the *Quercus Ilex*, the evergreen oak of our gardens and shrubberies, a native of Turkey; from the *Quercus robur*, the common British oak; from the *Ulmus campestris*, the common small-leaved elm; from the ash, *Fraxinus excelsior;* and from the bush-tea of the Cape of Good Hope, the *Cyclopia latifolia* of De Candolle, a plant of the natural order Leguminosæ.

From numerous plants which I tried I could not obtain a trace of kinone. This was the case among others with laburnum, *Cytisus laburnum*, with tobacco, with *Prunus spinosa*, the sloe, and others too numerous to mention.

The kinone was only obtained in crystals from the coffee-bean, from the coffee-leaf, and from the holly, *Ilex aquifolium*. In all the other cases, its existence was detected by the deep yellow liquid which distilled over at a comparatively low temperature, and which yielded the dark humus-like colouration with ammonia, so characteristic of solutions of kinone. Kinone is so exceedingly soluble in water, that unless a considerable amount of it is evolved, and proper precautions are employed, a deep-coloured solution of it only is obtained, either from the coffee-leaf, the berry or the leaves of the holly. The comparatively small amount of the kinone yielding substance, or perhaps we should say substances, present in such plants as the privet, the oak, &c., is most probably the only reason why crystals of kinone have not likewise been obtained from these plants.

In order to assist in forming an estimate of the comparative value of coffee-leaves as a beverage as compared with the bean, I determined the amount of soluble matter which each of them yielded to boiling water. 6.048 grms. of dried coffee-leaves and 6.038 grms. of roasted and ground coffee-beans were repeatedly treated with precisely similar quantities of boiling water, till the liquid which came off from them was nearly colourless. The 6.048 grms. coffee-leaves were found to have lost 2.348 grms. =38.8 per cent., while the 6.038 grms. roasted coffee-beans had lost 1.759 grms. =29.1 per cent. From this determination it is clear that coffee-leaves yield to boiling water near 10 per cent. more soluble matter than the bean. In this respect, therefore, the coffee-leaf has an advantage over the berry.

So far as regards the two characteristic principles of coffee, viz., caffeic acid and theine or caffeine, these are common both to the leaf and the bean, the leaf being decidedly rich in both. In other respects, however, they differ considerably. The coffee-leaf contains some tannin, and scarcely any sugar or fat. The coffee-bean contains about 12 per cent. of fat and "8 per cent. of cane-sugar." (See Joint Report.)

So far as I can judge, the infusion of the coffee-leaf has a much greater resemblance to that of tea than to a decoction of the coffee-bean; so that should the coffee-leaf ever come into general use in European countries, it will be rather as a substitute for tea than for coffee. If the coffee-leaves were only dried at a somewhat lower and better regulated temperature, I have little doubt that they would yield a much more agreeable beverage than can be made with the present roughly-roasted and partially empyreumatized product.—*Philosophical Magazine.*

Chemical Laboratory, Bartholomew's Hospital,
December 1, 1853.

MALATE OF LIME IN THE LEAVES OF THE COMMON ASH.

The leaves of the ash have latterly been used medicinally. They are said to be serviceable in gouty affections, and, according to Emile Mouchon, purgative.

The brothers Garot* have examined them chemically, and find that they contain malate of lime, which is extracted by simple infusion. From one kilogram of the leaves they obtained fifty grm. of malate of lime. They have not analysed the acid.

REMARKS ON SARSAPARILLA,

BY DR. BERTHOLD SEEMAN.

At a meeting of the Linnean Society, held December 6, a paper was read by Dr. Seeman on the above subject, of which the following abstract is given in the *Gardener's Chronicle* :—

"In this interesting memoir, Dr. Seeman stated, as the conclusions at which he had arrived, after a careful investigation of the subject, that the greater proportion of Sarsaparilla imported under the commercial names of 'Jamaica,' 'Lisbon,' or 'Brazilian,' and 'Guatemala' or 'Red Paraquay' Sarsaparilla, is the produce of one species only, and that the Smilax officinalis of Humboldt and Bonpland; and further that the S. medica of Schlechtendal and Chamisso, and the S. papyracea of Poiret, are identical with it. Smilax officinalis grows in the lower coast region as well as on the mountains to an elevation of 5000 feet above the sea, and is confined, as far as is known, to the South American continent between the 20th degree of N. lat. and the 6th degree of S. lat., and the 110th and 40th degrees of West longitude. The article known as Jamaica Sarsaparilla is imported into that island from the Spanish Main. The roots, which form the commercial article, abound more or less in starch, according to the age and the conditions under which they have grown. The stem is quadrangular and prickly, the branches also quadrangular or multi-angular, and with or without prickles, the petioles sheathing at the base, and having a pair of tendrils, the leaves very variable, broadly cordate, almost three-lobed, gradually acuminate or ovate-oblong, or even lanceolate, and rounded at the apex, but always mucronate, generally five-nerved, and prickly on the nerves beneath, varying in length from two inches to one foot, and in texture from coriaceous to papery; the flowers, which grow in little umbels of about sixteen together, are unknown, but the berries are round, red, and the size of a cherry. Dr. Seeman further remarks, that while botanists competent to judge of the question are not likely to raise any objection to his uniting these three supposed species, pharmacologists are less likely to be convinced on this point, except on the strongest evidence, the appearance of the commercial samples being so different; the Lisbon Sarsaparilla, which comes in rolls about three feet long, having fewer rootlets or beards than that termed Jamaica Sarsaparilla. This difference, however, was stated to be clearly the result of the rootlets having been removed by some mechanical means or other, before the article reaches the market. The condition indicated by the chief pharmacological distinction into 'mealy' and 'non-mealy' samples, he believes to depend on the age of the roots, and on the locality in which they are collected. While, however, the botanical source of the various Sarsaparillas was thus held to be identical, the value of the commercial distinctions, as such, was admitted; for 'as long as the Brazilian collectors continue to strip the roots of their beard and put them up in long bundles, there will always be Lisbon Sarsaparilla; as long as the inhabitants of the Spanish Main continue to preserve the rootlets we shall have Jamaica Sarsaparilla; and as long as the climate and other physical conditions of Guatemala remain unchanged, we shall continue to receive from that locality Sarsaparilla distinguished by its abundance of starchy matter.'"

PERCENTAGE OF IODINE IN THE WATER OF THE RIVER ALMENDARES, THE LAND PLANTS AND ATMOSPHERE OF TROPICAL COUNTRIES.

The fact that goitre does not occur in Havannah or any part of Cuba, led Casaseca† to conjecture that the river water, land plants, and atmosphere of tropical countries would prove rich in iodine; his experiments have, however, given an

* *Journal de Pharmacie et de Chimie*, 3 Sér. xxiv., 308.

† *Comptes Rendus*, xxvii., 348.

opposite result; 500 litres of Almendares water mixed with 100 grm. of caustic potash, perfectly free from iodine, gave on evaporation a saline residue, consisting principally of lime and magnesia; it was treated with alcohol of ninety per cent., the solution evaporated, the residue dissolved in acetic ether and then in water. On the addition of starch and a few drops of nitric acid, the aqueous solution gave a distinct blue colour, somewhat less intense than that produced by a centigramme of iodide of potassium dissolved in the above volume of water. The water of the Almendares contains therefore one part of protoiodide of iron in fifty million parts of water, or $\frac{1}{5}$ milligrm. in ten litres of water.

Casaseca likewise examined the ashes of bananas, mais, &c., but did not find any iodine. He detected it in very small quantity in the ash obtained from one kilogram of fresh cress gathered on the banks of the Almendares. He did not find the least trace in the rain-water collected in June.

ON THE EXISTENCE IN THE HUMAN BODY OF A SUBSTANCE PRESENTING THE SAME REACTIONS AS VEGETABLE CELLULOSE.

Purkinje has found in the human brain a peculiar substance. which he describes as consisting of concentric layers, presenting a structure analogous to amylon granules. The same substance has subsequently been met with in other parts of the brain, in the superficial layers of the walls of the ventricle and in the spinal cord. Some observers are of opinion that the acervulus cerebri consists of this substance.

Virchow* has observed that this substance acquires a bluish colour when treated with a solution of iodine under the microscope; and that when sulphuric acid is added the colour becomes violet, as is the case with cellulose under the same circumstances.

The author also points out the fact, that the part of the brain in which this substance is found is in that region, the injury of which, according to the observations of Bernard, determines the production of saccharoid urine.

POISONING BY *LOLIUM TEMULENTUM.*

The town and neighbourhood of Roscrea were thrown into the greatest consternation on Christmas Day, during divine service, by intelligence having been communicated to the police that several families had been poisoned by having eaten whole-meal bread at breakfast. Medical assistance was immediately rendered to the unfortunate sufferers, when it was ascertained that they laboured, to an intense degree, under the violent symptoms produced by the seeds (flour) of the Bearded Darnel, commonly called *ryley*, which was mixed with the whole-meal. More than thirty persons received medical aid, and presented the following symptoms, as if from intoxication:—Staggering about, giddiness, violent tremors of the extremities and other parts of the body, similar to those observed in *delirium tremens*, but of much greater intensity—the patients requesting those about them to hold them, and experiencing great comfort for this assistance being given them—greatly impaired vision, everything appearing quite green to the sufferer, coldness of the skin, particularly of the hands and feet, great prostration of strength, and in several cases vomiting. The treatment adopted consisted in emetics of sulphate of zinc, which in some cases did not act, till a stimulant was given of aromatic spirit of ammonia in camphor mixture; then they acted freely, showing that paralysis of the stomach was, to a certain degree, produced by the *Lolium temulentum*, or *Ryley*. After the free and full action of the emetics, stimulants were administered, which consisted of brandy and water, and aromatic spirit of ammonia with camphor mixture. Castor oil was administered on the following morning, when all the sufferers were found convalescent, but much debilitated.

Under similar circumstances, emetics of mustard might be found more suitable, as mustard acts both as an emetic and stimulant. It is said, if the bread is eaten when quite cold, it will not produce the above severe symptoms.

Each seed has a long tail, which cannot be removed by any machinery that has been yet devised, and it will consequently be found mixed up with the bread. The

* *Comptes Rendus*, xxxvii., 492-493.

bread that remained was found, when examined, to be very heavy, close, and soapy ; some of it was made with soda, and some with plain water. This did not make any difference in the symptoms, which were the same in both cases.

The following is an extract from a very useful little botanical work, published by Mr. Moore, Curator of the Botanic Garden, Glassnevin :—"*Lolium temulentum*, Darnel Rye Grass.—This is the only one of our British grasses that is deleterious, and therefore more to be avoided than encouraged ; nothing marks out bad husbandry more clearly than its prevalence, as it inclines to grow mostly on poor, worn-out soil, especially where oats have been frequently repeated as a crop, where it sometimes forms a large portion of the produce ; and when the grain is made into meal it is very deleterious, and affects the head and stomach, as I have myself more than once experienced."—*Leinster Express*, Dec. 31, 1853.

CHEMISTS AND DRUGGISTS' INSTITUTE (MANCHESTER).

At a meeting of the Chemists and Druggists' Institute, held in their rooms, at the Wellington Chambers, 1, Victoria Street, Manchester, on Thursday, the 29th December, they presented to Mr. John Hamer (their honorary secretary) a beautiful timepiece, as a mark of their esteem, and as a small acknowledgment for his exertions in behalf of their Society. The President recapitulated the difficulties with which the Society had had to contend, and attributed the solution of them, as well as the present prosperous state of the Society, mainly to the indefatigable exertions of Mr. Hamer. He also briefly alluded to the origin and objects of the Society, and the prospect they had of carrying out these objects, which, he said, were for the more frequent social intercourse, and the mutual improvement and elevation of the Chemists and Druggists as a body, but especially for providing and establishing a system of education for the Assistants and Apprentices of Chemists and Druggists, with a view to their becoming Members of the "Pharmaceutical Society of Great Britain." He also strongly urged as a duty to the public, upon the Members and the Chemists and Druggists generally, the necessity of giving their Assistants and Apprentices the time and opportunity of acquiring this knowledge. He believed the time was not far distant when a high degree of education would be demanded, and be as essential to the success of the Chemist and Druggist, in his particular branch, as to any other of the medical profession.

COURT OF QUEEN'S BENCH.—January 26, 1854.

The Queen v. *the Registrar and Council of the Pharmaceutical Society of Great Britain.*

The Attorney-General appeared to show cause against the rule obtained by Sir Fitzroy Kelly, commanding the Registrar and Council to make and maintain the registers provided for by the Act of Parliament. He commenced by stating that he had a short answer to the application, having the clearest possible affidavits from the Registrar, that such a register had been and was kept. The court would recollect that the rule had been applied for with a view of striking off certain names, but it must be obvious that this would be an unprecented and most unjust course, inasmuch as the parties had a very great interest in their names being retained.

Lord Campbell observed that a mandamus to remove the names had been considered *ultra vires.*

The Attorney-General continued by observing that there was a great question to be determined with reference to the request of these parties to be upon the register, and that he was quite prepared, whenever the proper time arrived, to maintain that according to the terms of the Charter, Bye-laws, and Act of Parliament, the Council had acted quite rightly in the matter, but he was most anxious, as the rights of 500 or 600 persons were involved, that this question should be decided in the most formal manner, and so as to give them the most complete opportunity of taking the opinion, if necessary, of a Court of Error—an object which he did not consider could be secured under the present proceeding.

Some conversation ensued between Lord Campbell, the Attorney-General, and Sir Fitzroy Kelly, with regard to the objection taken, the affidavit of the Registrar, and the right of the parties to be on the register.

Sir Fitzroy Kelly said that his argument applied chiefly to the register of Pharmaceutical Chemists, which he considered to stand upon a different footing from the register of Members of the Society.

The Attorney-General stated that such a register had been kept, and proceeded to observe that if any mode could be pointed out by which the right of the parties concerned to be registered as Pharmaceutical Chemists could be tried in such a shape that the opinion of a Court of Error could be taken, he would be satisfied; but that this could not be done in the manner now proposed.

Sir Fitzroy Kelly suggested that the question might be raised if the Rule were made absolute, and the return to be made by the Registrar were traversed.

The Attorney-General objected, that the parties concerned, ought to have an opportunity of being heard upon their rights—that he had received no instructions on their behalf, and had no authority to assent to any course which would bind them.

Lord Campbell assented to the opinion that it was an inconvenient mode of trying the rights of individuals.

The Attorney-General observed, that the practical result of a decision that the return was incorrect, would be that the persons decided to be improperly registered, would have their names struck off, without having had an opportunity of being heard.

Sir Fitzroy Kelly, in reply to questions from Lord Campbell, stated that his argument was, that the Act imposed a duty upon the Registrar, in which the public had the deepest interest to keep a correct register of persons entitled publicly to call themselves Pharmaceutical Chemists, and the object of the *mandamus* was to compel the performance of this duty, as otherwise, the Act of Parliament would be a dead letter, there being, in his opinion, no other course.

The Attorney-General observed, that the Registrar was merely a ministerial officer, the right to determine who were entitled to be registered being vested in other persons, who had declared that the parties in question ought to be placed upon the list—which had been done. The Council had nothing to do with keeping the register; but when they had declared a person elected a Member, and eligible to be put upon the list, it was the duty of the Registrar to register his name.

Mr. Justice Coleridge asked whether, subsequently to the date of the Act, any persons could be registered without having passed an examination.

The Attorney-General contended, that the Council possessed a power to that effect, but this was the question disputed. He should contend that the Act was merely directory, and was not intended to do away with the powers conferred by the Charter and Bye-laws, but that the Council were legally justified in doing what they had done.

Sir Fitzroy Kelly, in reply to Lord Campbell, suggested that a case containing a statement of facts might be agreed upon to form foundation for an argument upon which the decision of the Court might be taken.

The Attorney-General submitted that a special case had no application to the circumstances in question, and that a return to the rule would be a less objectionable course than that proposed by his learned friend.

Lord Campbell agreed that there must be a formal proceeding.

After some further discussion, chiefly of a technical character, the Rule was made absolute.

REVIEW.

ELEMENTS OF MATERIA MEDICA AND THERAPEUTICS. By JONATHAN PEREIRA, M.D., F.R.S. & L.S. Third Edition, enlarged and improved. Vol 2. Part II.

WE have already announced the completion of the third edition of Dr. Pereira's work, the last part of which we have now to notice. This part appears under less favourable circumstances than did those which preceded it, a portion of the matter having been left in an unfinished state at the death of the author; yet it comprises all that the author had added from time to time, in notes and memorandums, together with his latest finished contributions. The work, in its present form, therefore, having received the last, although not the final, touches from the pen of him whose

reputation it will hand down to future generations, has an especial interest from this circumstance.

Our readers are aware, from the perusal of the previous parts of the work, that the arrangement of the matter, in this edition, has been somewhat altered from that previously adopted, and that new matter has been added, which occupies about 400 pages. The work now comprises notices of most of the medicinal substances in use in the civilized world, and is justly styled an "Encyclopædia of Materia Medica."

In the part before us, the "Tabular View of the History and Literature of the Materia Medica," has been considerably enlarged. It occupies thirty-one pages, and forms a most useful catalogue of the literature of Pharmacy in all countries.

The article on Cinchona had engrossed the attention of the author for several months immediately previous to his decease, and was the last part of the work which he saw printed. It extends over seventy-five pages, is illustrated with numerous wood-cuts, and, as a pharmacological memoir, possesses a value and interest which cannot be easily overrated.

The author commences the notice by a botanical description of the fourteen species of *Cinchona*, whose barks, it would appear, are more or less objects of trade. Seven other species are enumerated, which are not known to yield any of the Cinchona barks of commerce. An account of the bark-peeling follows, and then a general description of the structure of cinchona bark, preceded by a brief enumeration of the cryptogamic plants found upon it, as examined by Fée and Zenker. The description of the structure of the barks is illustrated with wood-cuts from original drawings, made, some of them by the aid of the microscope, under the author's immediate inspection.

These cuts are beautifully executed, and some of them serve to indicate the peculiar speckled appearance observed in the liber of many of the barks,—a subject which the author had been for some time investigating, with the view of ascertaining whether the white spots causing the appearance referred to, consisted of the alkaloids, or some combination of them, in their native tissues.

The investigation, as far as it had been carried at the time the article was written, is thus alluded to : —

"*Seat of the Active Principles.*—I have repeatedly submitted sections of Cinchona barks to microscopic examination, with the view of determining the seat and appearance of the alkaloids in their native tissues. The liber of many barks presents, even to the naked eye, a speckled appearance, owing to the presence of minute white spots. When we examine these spots by a low magnifying power, they are seen to be cells filled with a white solid substance. If we use the compound microscope, with an object glass of two inches focal length, the inner surface of the liber presents an amygdaloid appearance, owing to the presence of ovoid cells filled with a white substance, and imbedded in the yellowish brown tissue of the bark. Sometimes these cells are rectangular. Longitudinal and transverse sections of the bark show that these white masses are confined to the liber, and chiefly to its inner portion. In one specimen I discovered a thin layer of the white matter between the liber and the mesophlœum. These white masses I have met with more abundantly in the Cinchonine barks. When the white substance is submitted to high magnifying power, it appears like a crumbling mass, without presenting any distinct crystalline form. It is readily soluble in diluted hydrochloric acid, and the solution is not precipitated by oxalate of ammonia. It dissolves also in diluted sulphuric acid, and the solution by evaporation crystallizes. In alcohol, ether, and solution of caustic potash, it is only slightly soluble. It is probable, I think, that this white matter consists chiefly of some compound of the alkaloids of the bark."

In describing the various kinds of Cinchona barks, the author has adopted a geographical arrangement, "commencing," as he says, "with the more valuable barks of the southern Cinchona district (Bolivia), and, proceeding northerly, finishing with the less valuable barks of the most northern Cinchona district (New Granada)."

The whole notice is full of valuable information.

From near the end of the article on Cinchona, the revision of the work became the duty of the editors, Drs. A. S. Taylor and G. O. Rees, who were appointed after the death of the author. The difficulty of the task of completing the work of an

author so laborious and painstaking, and so well versed on all points that could be brought to bear upon his subject, will be readily conceded. We think the editors have acted judiciously in retaining as much as possible of the previous edition in an unaltered state. Some changes and additions, however, were necessary, and wherever new matter has been introduced it is clearly indicated by being placed within brackets. Several of the notes thus introduced are judicious and valuable; we observe such under the head Prussic Acid, and in several places in the account of Opium, and elsewhere. In other instances, we have found less satisfactory evidence of a careful revision of the matter. Upon several subjects, the late Dr. Pereira wrote elaborate articles which he published at the time, instead of reserving the announcement of his investigations for future editions of his great work. These notices have appeared from time to time in the pages of this Journal, and with such materials before them, it is to be regretted that the editors have in some instances neglected to bring forward the more recent information they contain, satisfying themselves with the insertion of a note at the end of the volume, in which it is stated, "We subjoin a list of some papers published by the author in the Pharmaceutical Journal, since the previous edition of this work. They will be found to contain many subjects of interest in addition to those noticed in these volumes." This is followed by a list of fifteen articles on various subjects.

In illustration of the omissions we complain of, we may refer to the article on *Amygdalus communis*, where it is stated that three varieties of the Sweet Almond are known in commerce, whereas in a paper published by the author in 1846, six varieties are described and figured.

More important omissions occur in the notice of Balsam of Peru, respecting which, new and valuable information was brought forward by Dr. Pereira, in 1850. This, however, has been very sparingly, and not very correctly, used by the editors. We are told that the plant yielding the balsam grows in Peru, New Grenada, Columbia, and Mexico; whereas the author, in the Pharmaceutical Journal, vol. x., p. 285, states that the balsam is "exclusively the produce of the Balsam Coast, which extends from the Acajutla to the Port Libertad, on the Pacific side of Central America."

We are further informed, on the authority of one M. Victor le Nouvel, that "Peruvian Balsam always contains a good deal of water, sometimes as much as sixty per cent.," a statement so improbable, that we are surprised to see it repeated without comment.

White Balsam of Peru is briefly stated, on the authority of Guibourt, to be Solid Balsam of Liquidambar, while not the least allusion is made to the White Balsam of Sonsonaté, which is derived from the seeds of the tree affording the so-called Black Balsam of Peru.

Moreover, no mention is made of Balsamito, which is prepared from the same tree as the Peruvian and White Balsams, all of which are described in the paper already referred to.

The promptitude with which the volume before us was completed, deserves commendation, but we observe a little indication of hasty revision in several places. Thus, in the notice of extract of Colocynth, no remark is made on the great difference in the products obtained by the London and Edinburgh processes, the statement of properties and dose being made to apply equally to both. In the account of Oil of Bitter Almonds, the notes which have been added, tend rather to confuse than to enlighten the reader, and do not, as we conceive, correctly represent the effects of the oil when deprived of hydrocyanic acid.

The editorial remark, introduced in the notice of *Spiritus Carui*, at page 1691, that "the simple solution of the oil, as recommended by the London College, is by far the best mode of preparing this and the other spirits of the Pharmacopœia," seems to indicate a want of practical knowledge and judgment in Pharmaceutical operations. We think Dr. Pereira would have said that the difficulty of obtaining the essential oils in an unadulterated state, and their great tendency, even if genuine, to become oxidized by exposure to the air, render the simple solution of the oils, without distillation, *by far the worst mode* of preparing the spirits of the Pharmacopœia.

It would, perhaps, be unreasonable to expect from the editors that vigilant watching of the drug market, by means of which the late Dr. Pereira was enabled to get the earliest intimation of any alteration that might occur in the importation

or commerce of drugs. It was this practical knowledge, constantly renewed by intercourse with merchants and dealers, which so eminently qualified him as a writer of the natural history of drugs. Without it he could not have kept pace as he did with the progress of knowledge, or have represented so faithfully the commercial changes which are constantly occurring, in reference to the numerous subjects comprised in his great work. We have been reminded of the cessation of the accustomed vigilance in these respects, on referring to the article on Senna. The statement that Alexandrian Senna is "mixed *always* with the leaves of *Cynanchum Argel*," although correct at the date of the former edition, is not so at the present time; for since attention has been directed to it in the drug market, this adulteration has become rather the exception than the rule. We have recently examined several bales of Alexandrian Senna, in some of which none of the *Cynanchum Argel* was found; and in the others it was difficult to collect enough for a specimen.

We find also, on referring to the account of sulphate of quinine, that no mention is made of quinidine among the substances used for adulterating the quinine of commerce; yet this is almost the only adulteration met with, at the present time, in that article.

A note at page 1720, and similar notes in other places, would lead to the inference that the editors had forgotten the title and purport of the work they were editing. They say, "Although Opoponax no longer finds a place in any British Pharmacopœia, we have thought it desirable to retain the description given by the author; as, judging of the future by the past, it will probably be restored to the Materia Medica in a future edition of the Pharmacopœia." It might be inferred from this that Dr. Pereira's work was intended to comprise only the Materia Medica of the British Pharmacopœias, instead of including, as the title-page represents, "notices of most of the medicinal substances in use in the civilized world, and forming an *Encyclopædia of Materia Medica*."

We must also advert to what appears to be a deviation from the principle announced by the editors in their preface as that by which they were guided in the introduction of new matter. They say that "they have in no case interfered with the views of the author." Yet in an editorial note appended to the notice of gelatine, at page 2232, it is stated: "Much absurd discussion has arisen as to whether gelatine is to be regarded in the light of a *product* or *educt* of the tissues. It is an educt of the swimming bladder of the sturgeon, and is properly described by the author (*infra*) as a *constituent* forming from 86 to 93 per cent. of isinglass. If an educt of the air-bladder of the sturgeon, it must be equally an educt of the skin of young animals, as of the calf, *i. e.*, it exists in the skin as such, and is not produced from it by the action of boiling water, any more than starch is produced from grain by a similar process." Now it is well known that, in common with other high authorities upon this subject, the late Dr. Pereira maintained that gelatine is a product and not an educt of the tissues; and we presume the discussion referred to in the above quotation was one in which he was opposed to one of the editors on this point. Little could he then have imagined that within so short a time his own book would be made the medium for designating his strongly advocated views as untenable and absurd. We hope to find this objectionable note omitted in the next edition, being uncalled for and inappropriate. The article headed "*Para Isinglass*," is also, we think, misplaced in this work. The title is obviously wrong, the substance referred to having no claim to be called isinglass, of which it possesses none of the properties. A brief allusion to it as a substance imported more as a curiosity than with any view to commerce, would have been sufficient.

While thus noticing a few imperfections which have occurred to us on perusing the concluding part of the third edition of *The Elements of Materia Medica*, we have nothing to retract from what we have stated on former occasions, namely, that the work is unrivalled either in this country or in any other, and that it will for many years continue to be the standard book of reference for Pharmaceutists, as well as Medical Practitioners. The difficulty of the task undertaken by the editors has resulted from the nature of the work itself,—its comprehensive character, and the high standard of excellence to which it had been raised by its author. There was but one man who could have finished the work as it was begun, and he has been cut off in the midst of his labours, leaving this great contribution to pharmacological knowledge as a memorial of his talents and industry.

BOOKS RECEIVED.

THE LITERARY AND SCIENTIFIC REGISTER AND ALMANACK FOR 1854. By J. W. G. GUTCH, M.R.C.S.L., F.L.S., &c. London: Bogue, 86, Fleet Street.

We have much pleasure in noticing this Annual Pocket Book, which, as usual, contains a large amount of useful information. The article on Astronomy contains a Table of the various Planets, including those recently discovered. In that portion devoted to Chemistry, there is a copious table of specific gravities by Herapath of Bristol

A MANUAL OF PHARMACY FOR THE STUDENT OF VETERINARY MEDICINE; *containing the Substances employed at the Royal Veterinary College, with an attempt at their classification, and the Pharmacopœia of the Institution.* By W. J. T. MORTON, Professor of Chemistry and Materia Medica in the College, &c. &c. Fifth Edition. London: Longman, Brown, Green, and Longmans, Paternoster Row. 1854.

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES. Edited by W. H. RANKING, M.D., Cantab; and C. D. RADCLIFFE, M.D., Lond., L.R.C.P. Vol. XVIII. July—December. 1853. London: John Churchill, Princes Street, Soho; Edinburgh: Maclachlan & Co.; Dublin: Fannin & Co.

TO CORRESPONDENTS.

A GENERAL INDEX TO THE 12 (OR 13) VOLUMES OF THIS JOURNAL.—We announced last May, the intention of preparing a General Index for the first twelve volumes of this Journal, as soon as 500 names should have been received as subscribers. Mr. Woolley informs us that several Members in Manchester desire to subscribe, and twenty names have been furnished. We have received a few names from other quarters, but not nearly enough to cover the expense of setting up the type. Those of our readers who wish to have the Index, are requested to communicate their intention to the Publisher without delay.

Mr. Duckett (Brentford) was answered by post, but the letter has come back.

J. E. T. (Leicester).—See our last number, page 324.

M.P.S. (Leeds).—(1). *Elements of Botany*, or *The Vegetable Kingdom*, by Lindley.—(2). Microscopes for ordinary purposes may be had for about four guineas; Powell's or Smith and Beck's high power microscopes, range from twenty to fifty guineas.—(3). Morton's *Manual of Pharmacy*, published by Longman.—(4.) Dr. Golding Bird's *Elements of Natural Philosophy.*

A. X. (Spilsby).—(1). Confectio amygdalæ if made dry will keep for several weeks. If mixed with water, it soon spoils.—(2). Acid sulph. aromat., see the Edinburgh or Dublin Pharmacopœia.—(3). The question has not been settled.

A Student (Southampton).—(1.) Lindley's *School Botany*, 5*s.* 6*d.*—(2). Not exactly.—(3). By passing the examination creditably.

G. M. C. (Seaford).—Chloride of sodium if absolutely pure, is not deliquescent. It usually contains a trace of chloride of magnesium, &c. The best remedy is to wash it, as the water dissolves the deliquescent salts, and being poured off quickly, the chloride of sodium is left.

A. P. S. (Great Yarmouth).—See Mr. Calvert's paper, page 356 of this number. We are not aware of any accurate test for the nutritive properties of Cod-liver Oil.

J. H. (Taunton).—We doubt the fact.

Alpha.—The ingredients will not mix unless the creosote be suspended by mucilage.

Mr. Dircks.—We received the specification too late for publication this month.

A. Z.—Not that we are aware of.

A Chemist.—We presume there would be no difficulty in getting a vessel, such as described, made to order. We have never seen them kept ready made.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. IX.—MARCH 1st, 1854.

THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

The letter of Messrs. Prichard and Collette, published in the Transactions of the Society for the present month, contains a proposition which appears so fair and plausible, that, in the absence of an explanation, some of our readers might be inclined to doubt the propriety of declining it. When a difference exists between two parties, the manly and straightforward method of proceeding, and that which is calculated to lead to the most speedy and amicable conclusion, consists in submitting the facts of the case to a competent tribunal, and abiding the result. When this can be effected by arbitration, much expense and delay may be saved; but when no tribunal except a court of law can settle the dispute, it would appear to be the most fair and judicious plan to reduce the question at issue to the smallest possible compass, with a view of simplifying it and divesting it of those intricacies which are calculated to confuse the mind and mislead the judgment.

Such is the avowed object with which it is proposed to submit a special case for the decision of the Court of Queen's Bench, and the refusal of the Council to accede to this proposition would be liable to misconstruction if the grounds of such refusal were not stated.

In the first place, the Council act as the representatives of the Society in its corporate capacity, and it is their duty to defend the Society against an attack, the object of which is to deprive it of nearly a third of its Members. Each of the parties whose Membership is disputed has a separate and individual right to be heard in his defence, and the Council have no right to bind these parties by a decision on a special case, in the preparation of which they had no share, and of which they are not cognisant. Secondly, the Council make their stand upon the fact that no special case is necessary, that the proceedings against the Society are uncalled for, and cannot by possibility tend to any good result.

The Bye-laws which have been made the subject of an attack, are, in the opinion of the Council, right and proper, conducive to the purposes for which the Pharmacy Act was passed, calculated to promote its objects, injurious neither to the public at large nor to any class of the community, a violation of no right or privilege, and an infraction of no provision of any Act of Parliament. We are told on high authority, that "sin is not imputed where there is no law," and as the Pharmacy Act neither enacts nor prohibits in express terms the provisions contained in the disputed Bye-laws, the question at issue can only be settled by reference to the context, and by a due consideration of the general scope and objects of the Act, taken in connection with the Charter and the Bye-laws of 1851. The Act does not enter into the details of the management of the Society, which are left in the hands of the Council, who are empowered to make Bye-laws, subject to confirmation and approval by the Members and by the Secretary of State. The Members of the Society, who are the parties chiefly interested, have approved and confirmed the Bye-laws. They are satisfied and desirous of carrying them into effect. The Secretary of State is satisfied, and has expressed his approval. His predecessor, to whom

the draft of the Bye-laws of November, 1852, had been previously submitted, also expressed his approval, and intimated that he was ready to confirm them as soon as they had been approved and confirmed by a Special General Meeting. The change in the Ministry occurred about this time, and Lord Palmerston, who came into office, performed that which Mr. Walpole had expressed his readiness to do.

The Council therefore maintain, that the proceedings against the Society are factious, vexatious, and tending to no good result. Their policy is strictly defensive; they neither give any assistance to their opponent in preparing his case, nor can they accede to a proposition which would have the effect of tying their hands without binding other parties.

In drawing the Pharmacy Bill, care was taken so to frame the penal clauses that the Act could not be used as an instrument for the gratification of personal malice or jealousy. With this view, it was enacted that the penalties under the Act should be recovered by the Registrar in the name and by the authority of the Council. This principle in jurisprudence is gaining ground, and it is obvious that the ends of justice are promoted by entrusting to a public prosecutor the duty of taking proceedings, instead of leaving it in the hands of individuals who are liable to be influenced by various passions or prejudices rather than the broad principle of justice.

That the intention above stated has to some extent been successfully carried out, is shown by the fact that all the lawyers are puzzled, and it has been found extremely difficult to frame and contrive a course of proceeding by which an individual in opposition to the Council, the entire body of Members, and two Secretaries of State, can resist the Bye-laws of the Society. The parties entrusted by the Legislature with the duty of taking proceedings under the Act, being satisfied as to the validity of the Bye-laws, and feeling persuaded that they are performing their duty in resisting what they believe to be a factious and vexatious opposition, a considerable amount of ingenuity on the part of the aggressor is requisite to invent a means of frustrating the intended operation of the Act.

The Solicitors, *on both sides*, have exerted themselves to promote an amicable arrangement, and thus to save their clients from the heavy expenses and annoyance which must inevitably result from protracted litigation. They see clearly that neither party can be benefited by these proceedings, that public justice does not require their continuance, and that litigation, under such circumstances, is a wanton waste of money, and an unjustifiable disturbance of the harmony of a valuable Society.

The Council have also acted with much forbearance. For a long time they forbore to notice the hostility and abusive language of their assailant, and when the motion for his expulsion from the Society was put to the vote, it was negatived. The notice of this motion had been urged by him as a pretext in justification of his legal proceedings, which he said were necessary "in self-defence." No such pretext now exists; the Council, in their desire for a restoration of peace and harmony, have dismissed from their minds all personal considerations, and confined their attention to the strictly defensive means of warding off a threatened injury to the Society.

There is only one individual whom nothing but the "pound of flesh" will satisfy, and upon whom all efforts to conciliate have no effect. When we see the peace of Europe disturbed by the obstinacy and rapacity of one man, the motive is transparent—he has an end to gain—namely, the extension of his territory. But with what object a Member of a Society persists in an aggression from which he can himself gain nothing—unless it be an unenviable kind of notoriety—the tendency of which is destructive to the Society and subversive of harmony and order, is a mystery which can only be unravelled by persons who have studied the dark side of human nature. It is currently reported that he

intends to file a Bill in Chancery, and that he has declared his determination not to leave a stone unturned until he has broken up the Society. We do not assert as a fact that the rumour is well founded, but mention it in order to give the party concerned an opportunity of contradicting it if erroneous.

Since the above was in type, the writ of mandamus has been served on the Registrar.

THE DIPLOMA OF THE PHARMACEUTICAL SOCIETY.

At the risk of being charged with repeating a thrice-told tale, we are obliged occasionally to revert to circumstances with which many of our readers are familiar, for the purpose of refreshing the memories of some, and correcting erroneous impressions entertained or promulgated by others. It may appear scarcely necessary to recapitulate or more minutely explain the nature and value of the Certificate of Membership of the Pharmaceutical Society and the meaning of the term Diploma, but we have lately observed that a confusion exists in the minds of some of our Members in regard to this subject, and we think the present a suitable time for adverting to it, as one of the recently established Bye-laws, which is about to come in force, will have the effect of making a tangible distinction between the Diploma properly so called, and the document which, although sometimes called by that name, is in fact nothing more than a Certificate of Membership.

The origin of this Certificate is mentioned in the early numbers of this Journal (September and December, 1841, vol. i., pages 84 and 264). It was stated, in reply to the "inquiries and objections" of those who were invited to join the Society at the time of its commencement (vol. i., p. 83), that they would enjoy the "honour and distinction" of establishing a system of education and government which would ultimately raise their professional character, and on the principle that retrospective legislation in such cases would be unjust, all persons at that time in business were invited to participate in the advantage by joining the Society. This, it was asserted, would, *in process of time*, confer a status and character on the parties concerned, and would thus indirectly promote their success in business. But it was urged in reply (page 84), that, in order to establish the requisite distinction between the promoters of this improved system and other persons, an engraved Certificate of Membership should be given to each Member to identify him with the Society. A suggestion to this effect having been made by many Chemists who were communicated with, it was duly considered by the Council, and the result was the execution of the engraved Certificate of Membership, erroneously termed a Diploma. We say erroneously, because it was premature at that time to attribute to it a value and signification which it was intended prospectively to denote, but which it did not then represent. Care was taken to explain the fact that the then value of the document consisted in the distinction which it created between two classes of persons, namely, those respectable and established Chemists and Druggists who had united for the purpose of raising the status and qualifications of their body, and those who were indifferent, careless, and contented with mediocrity. Members were advised not to parade their Certificates ostentatiously, or to use them for purposes of puffing, but to consider them as nothing more than a badge of Membership in a Society designed *prospectively* to accomplish an important reform. In spite of all that has been said as to its liability to abuse, we are persuaded that the adoption of this Certificate of Membership had a good effect. It established a kind of freemasonry among the Members, often enabling them, when travelling at a distance from home, to recognize each other; it became an object of desire, and a bond of union; as one of the Bye-laws provided that the Certificate should be retained only during Membership, the reluctance to relinquish it tended to keep the Members together, although there were some

who did not scruple to take an unfair advantage of the then existing doubt as to the power of the Council to enforce the Bye-law.

In each successive year from 1841 to the present time, the value of the Certificate of Membership has increased with the growth of the Society, and this Certificate is gradually becoming what it was prematurely designated in the first instance—a Diploma. The Bye-law which is about to confer upon it this character, is that which provides that the Certificates of Membership of those who are admitted according to the terms of the 10th clause of the Act—that is to say, who pass the examination and pay the fees as life Members—shall be stamped with the common seal of the Society. A press for this purpose has been obtained by the Council, and in future this, will create a distinction between the positive qualification proved by passing the examination, and represented by the stamped Certificate or Diploma, and the implied qualification possessed by the original Members indicating their standing in the business before the passing of the Act, and represented by the Certificate of Membership, which is not stamped, and which is not a Diploma.

It would, however, be a perversion of facts to disparage the original Members of the Society on this account. They acquired their *locus standi* in the business before the examination was instituted. But for their early exertions and support the Society would not have existed, and the dates of their Certificates of Membership afford evidence of the priority of their standing. They have done more than the law required in forming the Society and introducing a system of education for their apprentices and successors. With the exception of a few hundreds elected under the Bye-laws of November, 1852, all the unexamined Members were in business on their own account before February 23, 1843, at a time when many of the Members by examination were apprentices, or even schoolboys. Their position is similar to that of the original Fellows of the Royal College of Surgeons, who were admitted to that distinction not by examination, but by a due consideration of their standing and experience in the profession at the time the fellowship was instituted. In answer to the cavils which are raised with regard to what is called a "money qualification," we have only to repeat that the payment of fees is one of the conditions on which Diplomas are granted by examining bodies. And if, for example, a candidate, having passed the examination of the Royal College of Surgeons, did not at the time pay the fee, his Diploma would be withheld until the money were forthcoming.

The Diploma having been acquired by examination and the payment of the fees, is the property of the Member possessing it; the unstamped Certificate of the Pharmaceutical Society is held during the continuance of Membership, being forfeited in the event of the annual subscription or composition not being paid. The above are distinct from the Certificates of examination given to candidates by the Board of Examiners, and produced to the Registrar as his authority for placing the names on the register. Some persons contend that these Certificates are sufficient, and that the Diploma is superfluous and of no value. Any candidates who entertain this opinion may save the additional payment of five guineas, the fee for life Membership; but those who desire to be connected with the Society will enjoy that privilege and receive the stamped Diploma on the terms prescribed in the Bye-laws.

The original Members will gradually diminish in number as the examined Members fill up their ranks, and, in the course of twenty or thirty years, the existence of an unstamped Certificate of Membership will be a rare exception to the general rule, as the Certificate will have become, by that time, in almost all cases, a Diploma. This is the natural and legitimate progress of events which has been contemplated from the commencement, and which time and perseverance will bring to maturity, but which can neither be expedited nor frustrated by the sophistry which is employed to throw discredit on the Certificate and to ridicule the Diploma. The seed is sown, and in due time will produce the

desired fruit, if allowed to grow to maturity, but those restless persons who have not patience to await the result of their labours, and who are continually grumbling because the work of years cannot be accomplished in a day, are like children who, having sown seeds, dig them up every day to see how they grow, and by this absurd interference nip the plant in the bud.

THE PROGRESS OF PHARMACEUTICAL REFORM IN AMERICA.

The proceedings of our brethren on the other side of the Atlantic in the endeavour to raise their professional character and status, are attended with circumstances and symptoms very similar to those which are observable in this country. We find, in the first place, very little disposition in the Legislature to interfere or assist in the movement. The public take little or no interest in it. The members of the medical profession sanction and promote the proceedings, but the labour and responsibility of conducting them rests on the Pharmaceutists. Here again we find the zeal and activity of the few struggling against the apathy of the many, and the work of reform gradually extending its influence, attracting fresh supporters, and exhibiting its results. The following extract of a letter, received last month from a correspondent in Philadelphia, will serve to give some idea of the progress which has been made, and the obstacles which still remain to be overcome :—

"It is exceedingly difficult to induce an interest in the minds of the great body of persons who in this country have the dispensing of medicines, in the movement of reform commenced by the Association. One of the strongest reasons with many is, that they are not prepared to relinquish the sale of quack medicines, which constitutes with many an important item of their business. Others, who are qualified by education and practice to take part, turn the cold shoulder of indifference; yet some of us feel encouraged to persevere, hoping that we shall gather strength with time and the agitation of the subject, until it will be the *interest* of all to join in the work.

"The scattered state of the Pharmaceutical body is another reason against great progress. It is difficult to get many together except in large cities; and, to give a national character to the Association, its Members should embrace all sections, and until the Members become sufficiently numerous to place the Association in possession of an annual income, much that mere money can accomplish cannot be effected. We have anticipated that the main good will be accomplished by *local* societies, instituted under the feeling called out by the national movement, and I believe that this will be one of its fruits after a season. In Boston, where we met last year, the Massachusetts College of Pharmacy have a course of lectures now being delivered, and it was expected that the same management would be carried out at Cincinnati, but of the last I am as yet uninformed. The Apprenticeship system is not generally adopted in our Western States; Druggists and Pharmaceutists depend on Assistants, many of whom go there from the Atlantic States; hence the material for supporting Schools of Pharmacy does not exist to the same extent west of the mountains as in the eastern cities. Our own School of Pharmacy has gradually increased in numbers; this session ninety-eight students are in attendance. Many of these —two-fifths—are from places at a distance, who come here either on an Apprenticeship of four years, with a view of graduating, or, when they have already acquired the practical details at home, come to remain during the period necessary to attend two courses of lectures; our diploma, although it does not indicate as much acquirement as European documents of the kind do, is getting to be more and more sought after, and it is gratifying to know that on several occasions where a Pharmaceutist was wanted for service at the naval hospitals, the preference has been avowedly given to graduates in Pharmacy.

"The regulation of all such matters as the practice of medicine and Pharmacy being vested in state legislatures, if legislated on at all, it is very difficult to get laws enacted discriminating in favour of the better educated; such a law in New York City is totally disregarded, and the only way seems to be to produce a favourable impression on public opinion through the influence of Associations.

"Many of us are watching your movements with interest. We have already derived much benefit from your past exertions, and anticipate from the increased vitality impressed on the Society by the Act of Parliament, yet more favourable fruits when you get through the difficulties incident to re-organization. It is much to be regretted that the working of your new Bye-laws should be impeded by those who should have the interest of the Society at heart;—such opposition is always unpleasant, especially when the parties are unscrupulous in the means they employ. I trust you will soon become settled and harmonious."

The report of the College of Pharmacy is encouraging, as it shows what may be effected by a voluntary system of education, when the status enjoyed by those who avail themselves of it is such as to become an object of ambition. It must be recollected that the College of Pharmacy in Philadelphia was established twenty years before the School of the Pharmaceutical Society of Great Britain, which has been about ten years in operation. Such institutions have great difficulties to contend with in the first instance, unless sanctioned by some legislative enactment or professional regulation, creating a demand for the education they afford. The Philadelphia College has surmounted these difficulties, and is in a flourishing condition. There can be no doubt, however, that if it had been assisted by a legislative enactment, making the possession of a qualification compulsory, its progress would have been more rapid and its influence more extended. It is wise to take advantage of all the means at command for promoting so desirable an object as the advancement of education, and notwithstanding the apathy of the Legislature and the lukewarmness of a large proportion of the Pharmaceutists in America, those who have embarked in the cause of improvement have persevered, and are using every exertion to extend the benefits of reform. They may congratulate themselves on the fact that they have no greater evils to contend against than apathy, and what is termed "the cold shoulder." Hitherto they have escaped the misfortune of discord and litigation, and we hope they will continue to maintain the harmony which at present prevails among them. There is one circumstance which may prove a safeguard against the annoyance which the Pharmaceutical Society is suffering in this country. The constitution of the Association of Pharmaceutists in America is founded on certain principles of ethics which all the Members are required to observe. Any Member who might be guilty of a breach of these principles, by ungentlemanly or factious conduct, would become amenable to the laws of the Association, and would be dealt with accordingly.

In a former number we quoted a few extracts from the Report of the Annual Meeting of the American Pharmaceutical Association, held at Boston in August last year. We have recently received a few copies of that Report for distribution, and subjoin another extract, which we think likely to interest our readers, as it contains some statistics and other information respecting Pharmacy in Philadelphia:—

REPORT FOR THE CITY OF PHILADELPHIA.

It is estimated that Philadelphia now contains about 480,000 inhabitants. The municipalities into which it is divided are, for the purposes of this report, regarded as constituting one city.

1st. *Of the number of Apothecaries and Druggists.*—There are three hundred and thirty-one wholesale and retail drug stores and chemical and pharmaceutical manufactories, as shown in the following table:—

Kind of Stores.	By whom kept.			Total Numbers.	
	Members or Graduates of College of Pharmacy.	Neither Graduates nor Members of College, nor M.D.'s.	Practising M.D.'s.	Total.	Proportion to the population.
1. Retail or Prescription	52	165	57	274	1 in 1719
2. General wholesale and jobbing.....	20	23		43	
3. Drug broking and selling by packages	4	5		9	
4. Chemical and Pharmaceutical manufactories.....	4	1		5	
	80	194	57	331	1 in 1450

In the above classification there are a few discrepancies, owing to the fact that some retailers occasionally do jobbing ; and some few of the wholesale stores practice extemporaneous pharmacy to some extent. The business of the 3rd class is confined to original packages. The chemical and pharmaceutical manufactories produce almost, or quite, exclusively medicinal preparations.

There are, besides these numerous chemical manufactories which produce chemicals chiefly used in the arts, eighteen stores established for the exclusive sale of quack medicines, some in which a single article is made and sold, others where several are made, and a third class in which a regular assortment of nostrums is kept, either with or without a stock of regular medicines. There are also three "homœopathic pharmacies," and "seven stores devoted exclusively to the sale of herbs and "eclectic" medicines.

2. *Of the Organization.*—The only organization of druggists and apothecaries in Pennsylvania is the Philadelphia College of Pharmacy, established March 13th, 1821, and incorporated in 1822. This institution comprises 91 resident members, of whom 37 are graduates of its school, and the others generally respectable druggists and apothecaries, who were established in business before the College was founded, and some of them its originators. The proportion of members of the College and of graduates not members engaged in the different branches of the business in Philadelphia, is shown in the following table:—

Description of Business.	Members.	Graduates not Members.	Graduates and Members.	Number of Persons in Business in Philadelphia	Proportion of Members and Graduates to whole numbers.
Retail or prescription	41	14	55	290	1 in $5\frac{1}{3}$
General wholesale and jobbing.....	22	7	29	84	1 in 3
Drug broking and selling by package.....	5	1	4	11	1 in 3
Chemical and Pharmaceutical manufactories	2	3	5	8	1 in 2
Medical practitioners	6	1	7		
Clerks or employées	5	8	13		
Removed or given up business	10				
	91	34	113	393	1 in $3\frac{1}{2}$

The College owns the hall in which its meetings and lectures are held, which cost with the lot $12,000. The Board of Trustees, consisting of the officers of the College and sixteen members elected annually, are entrusted with the management of its concerns. The operations of the Institution may be enumerated as follows:—

1st. The *School of Pharmacy*, in which there are three Professors teaching severally *Materia Medica*, *Chemistry*, and *Pharmacy*, to an average class in the last four years of seventy-six students, many of whom are apprenticed with the members. The whole number of matriculants in the school since its commencement is 1314, and

the number of graduates 203, many of whom are located in various parts of the Union.

2nd. The *American Journal of Pharmacy*, published bi-monthly, and containing, besides selected matter from other journals, a large number of original contributions from American pharmaceutists and chemists, has now reached its twenty-fifth volume.

3rd. The *Pharmaceutical meetings*, held monthly during the winter season, at which subjects of a scientific and professional character are discussed in a familiar and informal manner.

4th. The library and cabinets, which, although not now rendered as extensively useful as they are capable of being, should not be overlooked.

5th. The Committee on the preparation and publication of Latin labels, and

6th. The Register, kept by authority of the College for apprentices, assistants, and employers, wanting situations or needing assistance, to consult.

3rd. *Relations with Physicians.*—Physicians in Philadelphia almost universally issue written prescriptions, and in general a good degree of comity and professional etiquette is observed between them and pharmaceutists.

The County Medical Society and the College of Pharmacy have informally adopted a code of ethics for the government of their members in professional intercourse, and this has been generally observed by their members, though little respected by many outside of those bodies.

Fifty-seven physicians keep apothecary stores, generally leaving them in the hands of apprentices, or hired assistants, while they pursue the practice of medicine. This evil has greatly increased within a few years, especially in the poorer districts. It is frequently adopted by the young practitioner as a temporary means of support during the earlier period of his career, to be abandoned as soon as his practice shall become remunerative. A few physicians, not immediately connected with drug stores, have arrangements with one or two apothecaries in their neighbourhoods, who put up all their prescriptions and allow them a discount, said to be thirty per cent., on the amount received; the prescriptions being generally of the most profitable kind, the apothecary does not suffer so greatly as he otherwise might. This species of quackery is said to be confined to a few in the suburbs, although favouritism, founded upon motives of interest, is not unknown to physicians of a higher grade, and is most unfavourable in its effects upon the business of many of our most respectable and well-qualified pharmaceutists.

4th. *The standard of education and general character of Apothecaries.*—The average standard of attainment among Philadelphia pharmaceutists is probably quite as high as elsewhere; and, when compared with twenty years ago, has much improved. The proportion of scientifically-educated pharmaceutists is small compared with the whole number, but a large majority have been instructed in the practical details of the business to a sufficient extent to meet its ordinary requirements satisfactorily.

Great evil results from the fact that some young men, after spending a few months in a shop, and occupying their leisure in perusing the Dispensatory, announce themselves as qualified assistants, and engage under circumstances unfavourable to their continued improvement in the details of pharmacy, and to acquiring those habits of subordination so indispensable to a pharmaceutical student.

The *excessive competition among Pharmaceutists* in this city is one of the chief obstacles to the attainment of a high standard of knowledge and skill among them. There are retail stores in this city in which the whole year's sales do not reach $1000; and perhaps in a majority of the whole, the annual receipts range from $1500 to $2500. Few energetic and well-educated young men are content with so small a business; and, as a consequence, stores of this class are too frequently kept by rather inefficient and unambitious men, or are owned by physicians, as has been before said.

It is to be regretted that the small cost of locating a store of the kind referred to should operate as an inducement to individuals of small means and little capacity to take upon themselves the serious responsibility of our profession; but that such is the case cannot be disguised. In their hard struggles to earn a livelihood, it is not surprising that such persons should resort to many degrading and dishonest tricks of trade, which would bring discredit on the profession at large, were it not known that the mass of high-minded and honourable pharmaceutists utterly repudiate them. It is not merely in the multiplication of this lowest class of pharmaceutical shops that the evils of competition are seen. The compensation paid to pharmaceutists of first-rate ability is by no means commensurate with the

devotion of time, knowledge, and skill to the business. Except in certain limited portions of the city, the prices of prescriptions have diminished from twenty-five to fifty per cent. within ten years past, and the regular retail prices of many drugs and preparations have suffered a similar reduction, even in the best localities. To this reduction of profits is to be traced, in part, the disposition now apparent among our apothecaries to increase the variety of their wares ; to encroach upon the province of the tobacconist, the confectioner, and the dealer in fancy goods ; a disposition which, although in itself unobjectionable, seems to imply a less elevated view of the true mission of the pharmaceutist, a less clear appreciation of the truly liberal and scientific character of his profession.

The Retail Sale of Quack Medicines in Philadelphia has not, we believe, increased in the same ratio as the population. Our reason for this is, that so many apothecaries are disposed to co-operate with the mass of the medical profession in discouraging their use. An intelligent and conscientious opposition on the part of the great body of pharmaceutists cannot fail to be felt in the mitigation of this crying evil. In some cases this opposition may appear to be against the interest of the pharmaceutist, but we believe it will generally be found to open his way to a wider sphere of legitimate business, and that by confining himself within the recognized precincts of professional propriety, without countenancing the falsehood and imposture so inseparable from the quack medicine business, he may rise in the estimation of his honest and discriminating neighbours, to a position which may well be envied by the most successful charlatan. We have here numerous instances of the successful practice of pharmacy uncontaminated by quackery, attesting the peculiar application to our responsible profession of those high ethical principles which are everywhere recognized by the virtuous and the good ; showing that unswerving integrity and adherence to a high standard of rectitude are more sure passports to permanent success, and an honourable position, than the most energetic pursuit of wealth by the employment of means not sanctioned by the highest ethics and sustained by the purest morality.

5th. *Laws affecting the interests of Pharmacy.*—The only law of Pennsylvania, which our Committee are aware of, bearing upon our business, is one passed by the Legislature in 1849 for increasing the revenue, and at the same time to discourage the sale of nostrums. Under it, the most exemplary apothecary, if he even keeps Henry's magnesia and McMunn's elixir, is taxed as a vendor of patent medicines according to the amount of his sales, and being thus placed in the same category with the quack medicine vendor, is tempted to pay himself by increasing his assortment of the objectionable articles. The following is a copy of the law, viz.:

"In addition to the license now required by law to be taken out by vendors of merchandize, all manufacturers, vendors, agents, or other persons (except regular apothecaries for the sale of simple medicines, the prescriptions of physicians, and the compounds of the Pharmacopœia and the several dispensatories of the United States) engaged in the manufacture or sale of any nostrums, medical compounds, or patent medicines, whether pills, powders, mixtures, or in any other form whatever, shall also take out from the proper city or county treasurer a license for manufacturing, vending, hawking, peddling, or in any way selling such nostrums, medical compounds, or patent medicines. All such vendors shall be classed and required to pay annually to the use of the commonwealth for their respective licenses, as follows, viz.:

"Those who are esteemed and taken to effect annual sales to the amount of $100, and not exceeding $200, shall constitute the fourth class, and pay five dollars. Those to the amount of $200, and not exceeding $500, the third class, and pay $10. Those to the amount of $500, and not exceeding $1000, the second class, $30. Those to an amount exceeding $1000, and not exceeding $2000, the first class, $50. Provided that those who are esteemed to sell an amount exceeding $2000, shall pay an amount of $50, and 3 per cent. on all sales exceeding $2000.

"Any person convicted of violating the provisions of the above shall be fined not less than $50, nor more than $500, for each offence; one-half for the use of the commonwealth, and one-half to the person who shall prosecute such offender."

We are not aware that the above law has operated materially to suppress the trade, although its passage was dictated by the best motives, and we are far from urging its repeal.

(Signed) EDWARD PARRISH,
WILLIAM PROCTER, JR., } *Committee.*
AMBROSE SMITH,

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A

MEETING OF THE COUNCIL,

February 1*st*, 1854,

Mr. Brace attended and laid before the Council a letter from Messrs. Prichard and Collette, as follows:—

The Queen v. *the Council and Registrar of the Pharmaceutical Society of Great Britain.*

"Dear Sir,—The real question at issue in this case being whether, since the passing of the Pharmacy Act, the names of Chemists and Druggists who have not passed the prescribed examination can be legally placed on the 'Register of Members,' or the 'Register of Pharmaceutical Chemists,' and as the proceedings, whatever form they may eventually take, must result in this question being brought before the Court for discussion, we beg, before further expense has been incurred, to renew the offer made on the suggestion of the Court, to try the point by a special case, as the most convenient, speedy, and inexpensive mode of having it determined on its merits.

"Begging to disclaim any wish to influence the determination of the Council by anything that might appear like a threat, which we should most strongly deprecate, we think it due to all parties that we should at this early period openly state, that any application of the funds of the Society to the payment of costs will be opposed, and the question, if necessary, brought before the proper Court for decision.

"It having been repeatedly stated by Members of the Council that all they desire is a fair judicial decision on the point at issue, we are induced to hope that the offer we have been instructed to make will not be rejected through any misunderstanding of the motives of our client.

"Begging the favour of your laying this letter before the Council and the Registrar at the Meeting of the Council on Wednesday next,

"We are, dear Sirs, yours truly,

"Prichard and Collette,

"*Messrs. Brace and Colt.*" "57, *Lincoln's Inn Fields*, 27*th January*, 1854.

The above letter having been read, and Mr. Brace having stated that he could not advise the Council or the Registrar to concur in any proceedings which might compromise the position of any of the Members of the Society, or the persons whose names appear on the register; it was

Resolved,—That Mr. Brace be instructed to inform Messrs. Prichard and Collette that he cannot advise the Council and Registrar to comply with their wishes; and that as no practical good is likely to result from a continuance of Mr. Dickinson's proceedings, it is hoped the prosperity of the Society will be promoted by an abandonment of the present litigation.

The following

FINANCIAL STATEMENT,

From January 1st to December 31st, 1853, was laid before the Council, and ordered to be submitted to the Auditors.

RECEIPTS.

	£	s.	d.
Balance in Treasurer's Hands	35	7	3
Life Members' Fees	36	15	0
Benevolent Fund:			
Subscriptions 59 5 6			
Interest 121 13 5			
	180	18	11
Government Securities, Interest	181	5	8
415 Town Members' Subscriptions	653	12	6
2041 Country Members	2143	1	0
Entrance Fees	1915	4	0
469 Associates	246	4	6
Examination Fines	143	17	0
438 Apprentices	229	19	0
Registration Fees	54	7	0
Fees Pharmaceutical Chemists	131	5	0
„ Assistants	36	15	0
„ Apprentices	56	14	0
Arrears of Subscriptions	132	5	6
Lecture Fees	7	7	0
	£6184	18	4

EXPENDITURE.

	£	s.	d.
Life Members' Fund Investment	84	0	0
Benevolent Fund:			
Investment 278 4 7			
Gratuities 45 0 0			
	323	4	7
General Fund Investment	2040	0	0
Sundries	2	13	0
Tin Cases for Certificates	51	9	8
Repayments	11	12	9
House Expenses and Painting	239	16	9
Rent, Rates, and Taxes	337	11	9
Furniture	10	13	3
Postage	106	9	11
Stationery	27	13	10
Advertisements	1	2	6
Printing	126	10	5
Certificates	95	0	0
Collector's Commission	50	6	9
Board of Examiners	67	4	0
Grant to Branch of Society in Scotland	87	6	10
Travelling Expenses, Country Members of Council	97	14	10
Salaries	468	15	0
Wages	124	9	0
Journals	722	16	3
Delivery of Journals	68	17	0
Library	41	6	6
Lectures	416	7	0
Apparatus	6	6	0
Laboratory Repairs	20	0	1
Balance in Treasurer's hands	555	10	0
	£6184	18	4

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1853:

	£	s.	d.
On Account of the General Fund.....$3\frac{1}{4}$ per Cents. Reduced	6036	7	1
Benevolent Fund ...3 per Cent. Consols...	4391	6	2
Life Members' Fund 3 per Cent. Consols...	810	8	10
And at the same date there was due to the Benevolent Fund...	0	10	0
And to the Life Members' Fund	36	15	0

Edward Constance,
Alfred Allchin,
Thomas Burden,
James Lodge Moore,
} *Auditors.*

February 8th, 1854.

THE ELECTION OF THE COUNCIL.

The Lot having been taken, was declared to have fallen upon

Geo. Edwards, Dartford
J. B. Edwards, Liverpool
W. R. Giles, Clifton
Wm. Murdoch, Glasgow
P. Squire, Oxford Street, London
John Watts, Edgware Road, London
James Woolley, Manchester

who will therefore remain on the Council during the ensuing year.

PHARMACEUTICAL MEETING,

Wednesday, February 1st, 1854.

MR. DAVENPORT, VICE-PRESIDENT, IN THE CHAIR.

The following Donations to the Library and Museum were announced:—

Remarks on the Employment of the Waters of Kreuznach, from the Author, Dr. E. H. Sieveking.
Medico-Chirurgical Transactions, Vol. 36, from the Medico-Chirurgical Society.
Quarterly Journal of the Chemical Society, from the Society.
London University Calendar, 1853, from the University.
The Assurance Magazine, from the Institute of Actuaries.
Literary Gazette, from the Publishers.
Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Imitation Scammony. (See *Pharm. Journ.*, vol. xiii., p. 269.)
Ethiopian Pepper, from Mr. D. Hanbury.
Agar-Agar, from Mr. T. C. Archer, Higher Tranmere.
Nephelium Longan.
Crystals of Iron Alum, from Mr. Blyth.

IRON ALUM.

Mr. Blyth requested permission, as he had not been present at the previous meeting when a communication of his was read on Iron Alum, to make a few remarks on that subject relating especially to some objections which had been made to the use of the name Iron Alum. It had been said that this name was not sufficiently distinctive, as there are several iron alums; and Mr. Davenport had suggested the adoption of the names ammonio-sulphate or potassio-sulphate of peroxide of iron, as affording a better indication of the composition of the salt intended to be used. Perfectly agreeing with Mr. Davenport as to the importance of clearly defining the substances used in medicine, he (Mr. Blyth) at the same time thought that the name proposed by Mr. Davenport was even less definite than that of iron alum, as he had found that more than one salt could be formed by the addition of ammonia or potash to an acid solution of persulphate of iron.

He (Mr. Blyth) considered that the term alum, which originally had a general signification, having by modern Chemists been restricted in its application to salts having a certain definite constitution and crystalline form, its use in the way proposed for designating the salt in question was unobjectionable. If, however, the name *Alumen Ferri* should be thought to be not sufficiently distinctive, as it does not indicate the protoxide contained in it, an addition might be made to the name, thus: *Alumen ferri et potassæ*, or *Alumen ferri et ammoniæ*, which would place the composition of the salt beyond doubt.

Mr. Davenport said he merely wished that a name should be adopted by the use of which medical men would clearly define what they wished to be used. He differed from Mr. Blyth with regard to the salt obtained by the addition of ammonia to persulphate of iron; he had never obtained more than one definite salt.

Mr. W. Squire thought he had observed crystals differing from those of iron alum in a solution formed by adding potash to persulphate of iron.

Mr. Redwood thought that a good deal of the objection which attached to the use of the term *iron alum*, for designating a salt to be employed in medicine, would be removed by the addition to the name now proposed to be made by Mr. Blyth.

Dr. J. B. Edwards considered that the term iron alum was very indefinite, and that such names ought not to be used for designating medicinal agents. It had been shown that the term iron alum equally referred to any one of several salts.

Mr. Bastick quite concurred in what had been said of the insufficiency of the term iron alum to designate any one salt with certainty. He recollected some time ago seeing an account of an alum consisting of sulphate of quinine and iron, and Mr. Blyth himself had described several iron alums. He thought Mr. Davenport's suggestion a very good one, as the name he proposed indicated the composition of the salt referred to, and was, moreover, in accordance with the nomenclature adopted in our Pharmacopœia.

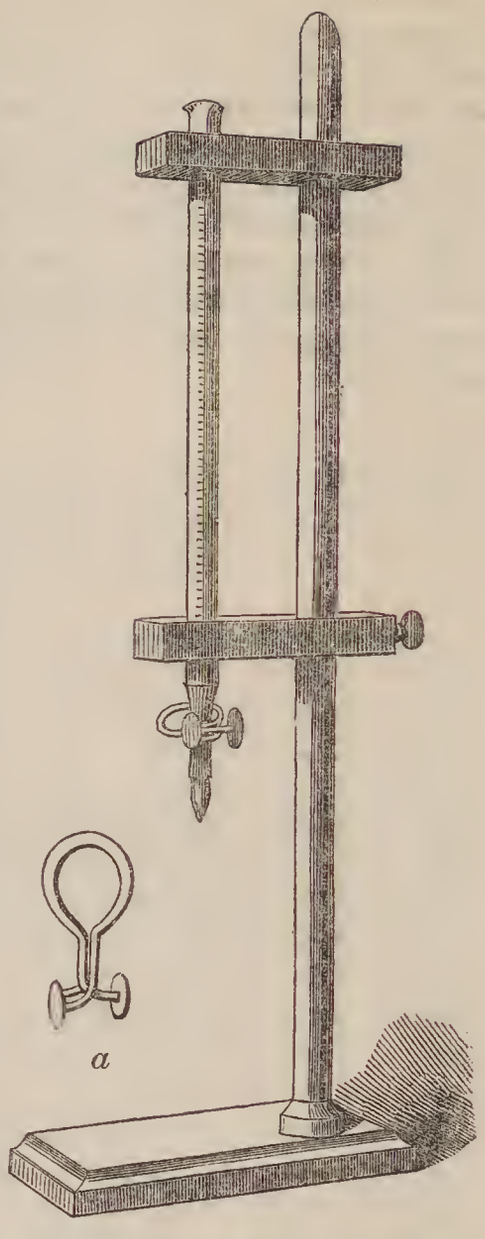
Mr. Cook was of opinion that the name used was of very little importance if it was generally understood, and he had heard no valid objection urged to the name suggested by Mr. Blyth, of iron alum with potash, or iron alum with ammonia.

ON DR. MOHR'S ALKALIMETER, AND THE APPLICATION OF THE VOLUMETRICAL PROCESS TO THE DETERMINATION OF THE STRENGTH OF ACETIC ACID.

Mr. Redwood made some observations on these subjects. He said he had several months ago intended directing the attention of the Members of the Society to some points connected with the estimation of acetic acid, a good deal of interest having been excited at that time by the publication of the analysis of samples of vinegar, which were said to be defective in strength, or mixed with an undue quantity of sulphuric acid. No opportunity had presented itself until now for bringing the subject before a meeting of the Society, and although the practical application of what he had to say had lost some of its importance by the delay in its communication, he should, nevertheless, in introducing to their notice a new form of alkalimeter, point out some difficulties in the application of the volumetrical method for determining the strength of acetic acid. The subject of volumetrical analysis was daily acquiring increased importance, and its value in the hands of the practical Chemist could hardly be over-estimated. In this method of analysis the quantity of some constituent of a compound, or mixture, was estimated by the volume of a liquid reagent required to be added in order to produce a certain visible and well-defined reaction. The reagents used were of a definite and known strength, and it was important to the success of the process, not only that the quantities used should be accurately measured, but that convenient means should be provided for adding the reagent in small quantities at a time, until the looked-for effect was produced, without exceeding the required quantity. Graduated tubes were used for this purpose, and as the process had been chiefly applied to the estimation of alkalies with acid reagents, and of acids with alkaline reagents, such tubes were commonly called alkalimeters. Several forms had been given to these tubes, as would be seen from the examination of those on the table. The improvements which had from time to time been introduced had reference chiefly to the means of regulating the flowing of the liquid out of the tube. When the required reaction was nearly produced it was necessary to add the test-liquid drop by drop, and at last a single drop produced the visible change which indicated that no further addition was required.

It was difficult thus to adjust the quantity with precision when the liquid was made to flow from the lip in the ordinary way, by inclining the tube; and Dr. Mohr's improvement in the alkalimeter was intended to meet this difficulty. This instrument, which possessed some advantages over any previously introduced, had already been described and figured in the Pharmaceutical Journal, but he was anxious to bring it more prominently under notice by exhibiting it in action. It consists of a graduated tube supported in a vertical position in a wooden stand. The tube is open at both ends, but the lower end is contracted, being drawn out; and to the contracted part is attached a short piece of vulcanized India-rubber tubing. There is also a short piece of glass

tubing inserted into the lower end of the caoutchouc tube, forming a spout from which the liquid is to flow. The caoutchouc tube is converted into a convenient stop-cock by a very simple contrivance. This consists of a bent wire (*a*), which, when placed on the caoutchouc tube, compresses it so as to prevent the flow of the liquid; but the grasp of the wire may be relaxed by pressing the projecting ends with the finger and thumb, and by this means the passage of the liquid may be regulated with great ease, so that it may either be made to run quickly or to drop very slowly.



The effect of neutralizing a dilute solution of one of the mineral acids, previously coloured with tincture of litmus, by the addition, from the alkalimeter, of a caustic alkaline solution, was shown, with the view of directing attention to the suddenness of the transition from an acid to an alkaline condition, as indicated by the change of colour—a single drop of the test-liquor causing the bright-red liquid to become distinctly blue. The delicacy and accuracy of the process depended upon this sharp and sudden change, which was always observed when any of the mineral acids were neutralized with a caustic alkali.

In performing the process with acetic acid, however, the result was found to be very different. Instead of a sudden change of colour there was always observed to be a gradual transition from red to blue through the different shades of violet, so that it was difficult, if not impossible, to determine when the exact point of neutrality was arrived at. This had been a source of many discrepancies in the results of the examination of acetic acid by different operators.

When a carbonated alkali was used, the difficulty of determining the point of neutrality was, of course, greatly increased, in consequence of the influence of free carbonic acid, produced in the decomposition and retained in the solution. It was necessary to expel this carbonic acid by the application of heat, and in operating with a volatile acid, like acetic acid, another source of inaccuracy was in this way introduced. Carbonate of soda was frequently employed for testing the strength of vinegar and acetic acid, this being the method indicated in the Pharmacopœia, and also in the Act of Parliament, in which the strength of "proof vinegar" is defined. The Act 58th of George III., chap. 45, states that proof vinegar shall be "such strength of acetous acid that one hundred parts of the liquor by weight will saturate or neutralize fourteen and a half parts by weight of crystallized subcarbonate of soda." Those practically engaged in testing vinegar, however, found it better, for the reason already stated, to use a caustic alkali instead of the carbonate. This change, although it lessened, did not entirely remove the difficulty, as even with a caustic alkali the indications of neutrality were ambiguous. This probably arose from the tendency which acetic acid has to form acid salts. He had reason to believe that the sources of error to which he had referred had been frequently overlooked, and on this account he had brought the subject before the meeting. He recommended the use of carbonate of baryta, as affording an available and reliable means of estimating acetic acid where great accuracy was important. Carbonate of

baryta being insoluble, and acetate of baryta being freely soluble, it was only necessary to add a weighed quantity of the carbonate to the acetic acid, and when the liquor became neutral to collect and weigh that which remained undissolved. The acetic acid was calculated from the amount of carbonate of baryta decomposed.

Dr. Edwards thought the remarks which had just been made had an important practical bearing on the preparation of *Liquor Ammoniæ Acetatis*. They had every day experience of the difficulty of getting this medicine in a definite and perfectly neutral state. As carbonate of ammonia was used in making it, it was necessary to boil the solution on testing it with litmus; but even then it appeared the indications of neutrality were ambiguous, in consequence of the formation of binacetate of ammonia as well as neutral acetate.

Mr. Bastick concurred entirely with what had been stated by Mr. Redwood of the value and importance of the volumetrical method of analysis. As there appeared to be some difficulty in applying it with accuracy for the estimation of acetic acid, he would suggest a modification of the usual mode of operating which he thought was worth trying, and that was, to add the alkaline test-liquor to the acetic acid until a decidedly alkaline reaction was produced, and then to bring it back to the point of neutrality by the use of a test mineral acid, such as hydrochloric or sulphuric acid. He would be glad to know whether Mr. Redwood had tried this method.

Mr. Redwood had not tried the method referred to by Mr. Bastick, but he thought the suggestion a good one.

CANDIDATES WHO HAVE PASSED THE

MAJOR EXAMINATION.

*Bannister, Edward.....London.
*Barnsby, Robert David.....Tours.
*Jefferson, Ebenezer Walker.....Beccles.

Erratum.—In our last Number, page 352, first line, for "*Brett*" read "*Butt*."

MINOR EXAMINATION

*Attfield, John .....Walworth
*Butler, John Symes.....Frome
*Hopwood, Thomas Smith .....Richmond
*Prosser, Evan Thomas.....Cardiff
*Willett, Edmund .....Brixton.

* Honorary Certificates.

CLASSICAL EXAMINATION.

NAMES.	RESIDING WITH	TOWNS
Cocking, Thomas	Mr. Wood	Holbeach
Cornish, Thomas R	Mr. Cornish	Penzance
Dalrymple, William	Mr. Tuff	Oxford
Griffiths, Alfred W	Mr. Griffiths	Clerkenwell
Jefferson, Thomas	Mr. Deck	Cambridge
Wood, John Robert	Mr. Simonds	Boston

PHYTOLOGICAL CLUB.

February 8th, 1854.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Some fine specimens of the *Olea fragrans*, in flower, were exhibited by the President, as well as a specimen of the fruit of the *Luffa pentandra*, or Sponge Gourd. The President remarked, that the flowers of the *Olea fragrans* were very fragrant—they are the *Lan-hoa* of the Chinese, and were used by them to perfume teas.

Communications were received from Edinburgh and Worcester, and Mr. Blyth made some interesting observations on the weather of the past month, and promised a paper on the relation of meteorology to botany for the next meeting. The meeting was then adjourned to March 8th.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

A Scientific Meeting of the above Society was held in the Rooms of the Society, 72, Princes Street, on Tuesday evening, the 21st February, at half-past eight o'clock;

H. C. BAILDON, ESQ., VICE-PRESIDENT, IN THE CHAIR.

The following communications were announced :—

1. Illustrations of the value of Botanical History to the Medical Student and Practitioner, by Dr. Lauder Lindsay, Crichton Royal Institution, Dumfries.
2. A few remarks upon the substance now used as a substitute for Tartaric Acid in the Gazogene Apparatus, by Mr. John Mackay, Edinburgh.
3. Specimens of Dye Woods, from John Poynter, Esq., Glasgow.
4. Particulars regarding the Prize Essay in connection with the Edinburgh Register Fund, to be competed for by the Associates of the Society residing in Scotland.

The meeting having occurred late in the month, we are unable to publish a detailed report in this number.

LIVERPOOL CHEMISTS' ASSOCIATION.

A Meeting of this Association was held in the Royal Institution on the 28th of January, Mr. Rawle, President, in the chair, when a paper (the second of a series) was read

ON THE APPLICATION OF HISTOLOGY, OR THE SCIENCE OF TISSUES TO PHARMACY.

BY MR. HENRY SUGDEN EVANS.

White hellebore, turmeric, ginger and jalap, formed the subjects of this communication.

White hellebore, the rhizome (but commonly called the root) of veratrum album, consists of the rhizome with a crest of dried leaf cases and a few root fibres at its base.

The structure of the rhizome wholly differs from that of a root proper, in as much as the central portion, presenting a different structure from the exterior, is composed entirely of cellular tissue and not of vascular bundles, as in the central cord of roots properly so called.

The cellular tissue composing the substance of the rhizome, consists of slightly elongated squarish cells, for the most part filled with minute round, or oval and truncated starch grains. The membrane is slender and readily ruptured. Besides these, numerous larger and more rounded cells, with very thin walls and containing an homogeneous substance, in all probability fatty matter, are found loosely adhering to one another. Numerous vascular bundles, consisting of elongated woody cells with thick deeply pitted walls, and clearly defined spiral vessels, are found amongst the cellular tissue.

The epidermis of the rhizome consists of a continuous membrane, composed of a single row of small angular cells, with thick walls, amongst which are to be found numerous oval cells characteristic of its stem origin. Raphides are very abundant, forming dense bundles of acicular crystals of phosphate lime within the cells. A few solitary crystals of larger size are also met with, consisting, in all probability, of super-gallate of veratria.

The crest of leaf sheaths consists almost entirely of elongated cells and spiral vessels. The former are filled with raphides and a yellowish granular matter, and when seen transversely are rounded or angular.

Within the root-fibres attached to the base there is a central woody portion, consisting of extremely elongated cells, thick walled and pitted. The appearance of these tubular bundles is apt to lead to the supposition that foreign matter is present, unless the observer is aware of their universal and unavoidable presence.

Turmeric was the next substance referred to. The substance of this rhizome is composed of cellular tissue, the cells of which are large and angular, with thin, colourless, and transparent walls, often obscured by the depth of the colour and opacity of their contents.

The central portion of the rhizome is usually divided from the exterior by a ring of vascular bundles, composed of jointed or cellular woody fibre, and large open, dotted, or pitted ducts. The epidermal coat consists of a single layer of large cubical or slightly elongated cells, with thick walls, containing a yellowish-brown colouring matter. The large, irregularly angular masses which occupy the interior cells, are by far the most important and characteristic forms met with, as their form and character is persistent. They accurately fill, and therefore take the form of the cells, and consist of curcumine, the peculiar colouring principle of turmeric, with a little starch, which may be readily detected by its characteristic reaction, when these masses are ruptured in a weak solution of iodine. By the action of alkalies, this yellow colouring matter becomes brown, and by that of boracic acid, red.

Numerous globules are also found floating about amongst the tissue, consisting of a yellow acrid volatile oil, soluble in ether, as well as many irregular fragments of a deep orange-brown resin.

Ginger formed the next illustration. Though generally termed a root, it is the underground stem of the Zingiber Officinale. When cut, those rhizomes which are young and considered to be of fine quality present a smooth, soft, lemon-coloured surface, and exhale a most grateful and pungent aroma. The central portion of these rhizomes is found to consist of cellular tissue, of which the membrane is excessively thin and delicate, slightly pitted, and tearing with great ease ; the cells are abundantly filled with starch grains of large size, about $\frac{1}{500}$ of an inch long, $\frac{1}{750}$ broad, and $\frac{1}{1200}$ thick ; they are very transparent, ovoid bodies, with a minute hilum at their narrow extremity, which, with the concentric markings, is often almost invisible, owing to the extreme thinness of the grains. Many of the cells are filled, or partially so, with a yellow resinous matter, resembling in physical characters that of turmeric. The cellular structure is traversed by numerous bundles of elongated woody cells and well-defined spiral vessels ; yellow globules of oil are also found interspersed in abundance amongst the tissues ; raphides are also found here and there.

In referring to the adulterations of powdered ginger, Mr. Evans said the substances usually employed for adultering ginger were wheat flour, or some farinaceous substance. One sample of a very pretty looking "prepared ginger" which he had examined, consisted of about one part ginger, two parts wheat flour, and one part sago and India meal, coloured with turmeric, and rendered sufficiently pungent with cayenne. Though pungent, the powder was almost destitute of aroma, and, as might be supposed from there being only about twenty-five per cent. of true ginger, which in all probability was of the commonest description, the powder was sold at a very low price. The adulterations generally met with in ginger are not difficult of detection. They consist of farinaceous matters of various kinds, known by the shape, size, and other characters of their starch grains ; turmeric is readily detected by the large, angular, yellow masses, so characteristic of that substance ; mustard and pepper husks, and cayenne, by the form of the cells composing their tissue ; frequently other matters, such as chalk, sulphur, and disgusting acari, may be detected.

Jalap is the tuber of *Exogonium purga*. Amongst the jalap of commerce we meet with tubers of very different qualities, some evidently having been gathered after the flowering of the plant and others that have been gathered prior to that period ; the former may be considered as mature jalap, the latter as immature. Microscopically examined these two varieties are found to differ very materially. Thus in the mature jalap we find many large rounded cells, with thin walls, filled with starch grains tightly packed, with others of the same character, but empty and collapsed. These form the substance of the tuber, but interspersed amongst them we find many large, elongated or angular cells, with thin walls, filled with resinous matter, insoluble in ether. This is the resin peculiar to jalap, and to which it owes its purgative properties. It is secreted from the elaborated juice of the plant. Other cells, of like shape and size, containing minute fragments of resin, with sugar and gum, are also met with. The epidermis consists of a layer of elongated angluar cells, with thick pitted walls, firmly adherent to one another. Numerous oval cells also occur upon the surface with much thicker and more deeply pitted walls. Dis-

persed through the cellular substance of the tuber, but chiefly abounding within the deeper coloured resinous zones of the tuber, are numerous bundles of large pitted ducts. Starch grains are numerous, of small size, contained for the most part within cells, but frequently loosely distributed amongst the tissue also. Associated with these in the cells are numerous stellate groups of raphides.

In the immature tubers, on the other hand, we seldom find any of the deeply pitted oval epidermal cells, and the epidermis consists of much larger and very irregularly angular cells with thick walls. Instead of finding the greater portion of the cellular tissue filled with starch, immense numbers of collapsed empty cells are found. A few large, thin walled cells also occur, filled with a resin insoluble in ether, as well as some with a resin soluble in that menstruum. Some few contain sugar or mucilage. Vascular bundles are numerous, but the pitted ducts are of smaller dimensions than those of the mature tuber. Fragments also of a tessilated tissue are met with here which were absent in the mature tuber. Loose starch grains are not absent, but a greater abundance of minute bodies, apparently the emptied or collapsed starch sacs are present. Stellate groups of raphides also occur. Thus it may be concluded, from finding in this latter variety of tuber the cells chiefly empty and collapsed, with but little starch and much sugar, and numerous minute bodies resembling emptied starch sacs ; a paucity of resin, and that which does chiefly occur being of a different character from that of the mature jalap ; that these tubers are in fact immature, the starch having been converted into sugar for the immediate appropriation of the rapidly-growing plant, and, in all probability, the tuber has been dug up just at the time the plant is beginning to expand its flowers and prior to the descent of the elaborated juices.

There is a kind of false jalap often met with in the market, known by the name of male jalap, or jalap stalks; it is the produce of the Ipomœa Orizabensis, which grows abundantly in Mexico. It differs essentially from the true jalap, in as much as it is a true root and not a tuber ; it consists of slices or segments of the root, some extremely fibrous and others heavy, solid, and resinous. Microscopically examined, large quantities of oval or rounded cells are found, with thin walls filled with minute starch grains. Empty or collapsed cells are nearly absent ; numerous cells filled with sugar, and a great many containing a greenish-yellow resin, soluble in ether, are abundant ; these cells are more of an elongated or cubical form than those containing starch or sugar ; there are also cells filled with a resin insoluble in ether, but much less numerous.

The epidermis consists of a continuous membrane, composed of large, irregularly angular cells, with thick walls slightly pitted ; no oval epidermal cells are found as in the true jalap. Large bundles of coarse pitted tissue and woody fibre are abundant, as might be expected from the fibrous nature of the root ; the pitted ducts very much resemble those of the true jalap, but, besides these, large quantities of coarse, woody fibre, composed of elongated thick walled cells, fitting into each other and forming continuous tubes, abound. Loose starch grains are by no means uncommon, and are minute, oval, truncated, or muller-shaped bodies, sometimes occurring in groups of twos and threes.

The chief source of adulteration in jalap is from the use of this male jalap, the general coarseness of which, and the large thick walled cells of the epidermis, its abundant woody tissue, small muller-shaped starch grains with abundance of resins soluble in ether, are sufficient to distinguish it from the rest. But other substances are sometimes used to reduce the true jalap, such as linseed meal, wheat flour, and guaiacum dust. Linseed meal is detected by the character of the cells forming the husk, which will be described in the next lecture, and guaiacum by the character of its woody cells.

THE MANCHESTER CHEMISTS AND DRUGGISTS' INSTITUTE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am requested by the Members of the Chemists and Druggists' Institute to forward to you the annexed for publication in the March number of the *Pharmaceutical Journal*, and to express to you the gratitude they will feel by your obliging them with the insertion, and remain, Sir,

Your most obedient Servant,

Jno. Hamer, *Secretary.*

The Manchester Chemists' and Druggists' Institute, the majority of whose Members were non-Pharmaceutical Chemists before the passing of the new Bye-laws of the Pharmaceutical Society of Great Britain, availing themselves of the privilege, and becoming Members of the Pharmaceutical Society, considered that the principal objection to the amalgamation of their Society with the Manchester Chemists' Conversational Society was removed, held a meeting of its Members, and appointed a deputation for that purpose, who waited upon the Chairman and leading Members of the Chemists' Conversational Society, to propose the union of the two Societies, when, much to their astonishment, an objection was raised against admitting them in a body, and were advised to dissolve themselves as a body, and apply singly in the usual way, and they might be admitted.

Such a course of proceeding was rendered impossible by the fact that the Chemists and Druggists' Institute had rented a room and furnished it for a library, &c.; consequently further negotiations were entered into, every concession was made by them that was consistent with honour, and they supposed honourably accepted by the other party. On the 17th January the Secretary of the Chemists' Conversational Society forwarded to them the following letter :—

111, *Oxford Street, Jan.* 17*th*, 1854.

Sir,—I am requested to forward to you as annexed, a copy of the resolution passed at the last meeting of our Society. If this should accord with the views of your Association, I shall feel obliged by your forwarding to me the list of your Members, with their subscriptions for the present year. In this case, your room, with its fittings, &c., may be transferred to our Society.

I am, yours truly,

James Roberton, *Secretary.*

They immediately acted upon these instructions, and presented to the Secretary a list of Members and a year's subscriptions, when to their astonishment he refused to accept them, and said he had acted upon his own responsibility, and that their Society refused to acknowledge or be bound by what he had done. Such conduct they consider ought to be made public, in order that the Members of the Pharmaceutical Society might know and judge for themselves how the elements of discord have been raised by a part of its Members in Manchester, and what object the adverse party could have in refusing to amalgamate with a kindred Society professing the same objects, and Members of one general body.

[If we rightly understand the facts, the question at issue relates to the amalgamation of two local associations, in which case we hope measures will be adopted for effecting a mutual arrangement, as a division, under such circumstances, would be injurious to the cause in which both parties are engaged. The amalgamation of two voluntary associations, not incorporated, can be effected without difficulty by mutual agreement between the Members. This could not take place with the Pharmaceutical Society, which being incorporated, and under an Act of Parliament, can only admit Members individually, according to the Bye-laws.—Ed.]

ORIGINAL AND EXTRACTED ARTICLES.

ON THE VARIETIES OF MANNA NOT PRODUCED BY THE ASH.

BY DR. X. LANDERER,
Honorary Member of the Pharmaceutical Society of Great Britain, Pharmacien to H. M. the King of Greece, &c.

In a classification of the varieties of Manna, the following substances are usually included :—

1. *Manna laricina sive Brigantina*, a saccharine substance found upon the leaves of *Larix Europæa.*

2. *Manna cedrina* appears in small globules on the branches of *Pinus Cedrus.* It is brought from Mount Lebanon, where a very small quantity of two or three drachms fetches from 30 to 40 piastres.* In Syria it enjoys considerable reputation as a remedy in the *Marás* or phthisis, and is an ingredient in electuaries, &c.

* The Turkish *piastre* is worth about 4*d.* sterling.—Ed. *Ph. J.*

3. *Manna celastrina.*
4. *Manna quercina.*
5. *Manna Australis*, produced by *Eucalyptus resinifera.*
6. *Manna cistina sive labdanifera*, a variety, with us in Greece, of the utmost rarity. On one occasion, in traversing a plain of considerable extent, abounding with *Cistus salviæfolius*, *C. villosus*, and *C. Creticus*, I found some drops of a saccharine exudation adhering to the stems of these plants, which I suppose should be regarded as Cistus-Manna.
7. *Manna alhagina.*
8. *Manna tamariscina.*

Upon the last two species of Manna I will offer a little information.

The Tamarisk-Manna, also known as *Manna Israelitarum*, is produced through the puncture of *Coccus manniparus*, an insect inhabiting the trees of *Tamarix mannifera*, which grow abundantly in the neighbourhood of Mount Sinai. The monks from the monasteries of the district collect the saccharine secretion which exudes as a thick, transparent syrup, covering the smaller branches from which it flows. The collection of the Manna takes place in August; it requires to be performed very early in the morning, at which time, owing to the coolness of the night, the saccharine juice has become to some extent congealed. Later in the day, the solar heat causes it to drop upon the ground. When collected it is usually stored away in large earthen vessels, which are preserved in cellars during the entire year. To strangers visiting the monasteries of Sinai, the Tamarisk-Manna is sold in little vessels of tinned-iron. One of these I purchased of a pilgrim who had been in Palestine. The Manna was a yellowish, granular, syrupy mass, very sweet and intermixed with the little leaves of the Tamarisk. It dissolved in water or in alcohol, and the aqueous solution readily fermented; the alcohol obtained by distillation had a peculiar odour resembling that derived from the fruits of *Ceratonia siliqua*, which contains Butyric Acid. The Manna is eaten in Palestine and in the neighbourhood of Sinai as a delicacy, and is reputed efficacious in diseases of the chest.

The Alhagi-Manna is the exudation of *Hedysarum Alhagi*, Linn., a plant indigenous to Arabia, and growing also in the maritime districts of Greece.

In the latter country it is, however, extremely rare to find the saccharine matter exuded, though by no means infrequent in Asia Minor, and especially in Arabia and Palestine.

Extensive plains are there entirely covered with the *Hedysarum*, which one may observe appears to afford the manna chiefly through the wounds occasioned by the browsing of the sheep and goats. It is collected by the leaders of the caravans and by the Arabs who cross the deserts, and who avail themselves of this manna as nutriment. It is this substance which appears to me to be the *mel ex äere* of Pliny and the *humor melleus* of Theophrastus.

In conclusion, I will add a few words respecting the Cedar-Manna which occurs as a great rarity on the branches of the cedar of Lebanon in the form of transparent resinous drops, indubitably the result of the punctures of an insect. The monks of the Lebanon collect this resinous matter, preparing with it various *mantsuns* and *melhems* (*i. e.* electuaries and ointments), which are sold to strangers visiting the monasteries.

GUACO, AN ANTIDOTE FOR SNAKE BITES.

A RECENT announcement of the successful employment of a drug called *Guaco* in some cases of deafness has induced inquiry for it in London.

We think it desirable to point out that the name *Guaco* is applied in Central and South America to *various* medicinal plants, which are considered either as prophylactics or as antidotes to the bite of venomous serpents.

"Great misconception," writes Dr. B. Seemann,* "appears to prevail, and much has been written about the plant, which ought to be considered the true *Guaco*. But the fact is, that nearly every country has its peculiar *Guaco*. At first, the name was, probably, confined to only one species; when, however, in newly-discovered regions, the original plant was not found, the appellation was transferred to another that happened either to resemble it in appearance or to possess similar properties."

Humboldt and Bonpland, in their *Plantes Equinoxiales*,† described the *Guaco* of New Granada, under the title of *Mikania Guaco*, Nat. Ord. *Compositæ*, tribe *Eupatoriaceæ*. To this plant, which has occasionally been imported into Europe in a dried state, Guibourt, Martiny, and other pharmacologists, restrict the name *Guaco*. Other species of *Mikania*, also called *Guaco* or *Huaco*, and but very imperfectly known, have been enumerated by Dr. Pablo de la Llave as employed medicinally in Mexico.‡

The genus *Aristolochia* likewise contributes many species of *Guaco*. We have before us the woody stems of several kinds from Honduras, which we feel no hestitation in referring to this genus. Even the common Virginian Snake-root had a reputation, as its name implies, as a remedy for the bite of a serpent; and many other *Aristolochiæ* are mentioned by Dr. Lindley, as considered to possess similar virtues. The same author states, on the authority of Dr. Uslar, that a species of *Convolvulus* is used in Mexico under the common designation of *Guaco*.§

Such being the uncertainty attaching to the vernacular name, it would surely be better, in the science of medicine, to dismiss it entirely; and that if prescribed, it should be under a definite botanical name.

We do not know which of the species of *Guaco* afforded the good effects in deafness above alluded to.

NOTES ON SOME ANCIENT GREEK MEDICAL VASES FOR CONTAINING LYKION.

BY J. Y. SIMPSON, M.D., F.R.S.E.

Professor of Midwifery in the University of Edinburgh, President of the Medico-Chirurgical and Obstetric Societies, &c. &c.

No. I. No. II. No. III.

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* *Hooker's Journal of Botany*, March, 1853, p. 76. † Vol. ii. p. 84, pl. 105.
‡ *El Mosaico Mexicano*, tom. ii. p. 299, quoted by Seemann, *op. cit.*
§ *Vegetable Kingdom* (1846), p. 631.

No. IV. No. V. No. VI.

(*Size of Originals.*)

The physicians and surgeons who, in ancient times, pursued their medical profession at Rome, and in different parts of the Roman empire, have left us various palpable relics of their craft. Thus, in the ruins of Pompeii and Herculaneum, numerous surgical instruments, pharmacy and drug-bottles, &c., have been found; and elaborate drawings and accounts of these have lately been published by Savenko, Vulpes, Renzi, and others. On the sites of the old Roman cities and colonies throughout Western Europe, various surgical and medical relics of the same kind have been at different times discovered: as lancets, probes, cupping-glasses, scalpels, oculist-stamps, phials, &c. But of medicine, as it was still earlier exercised in Greece and in the Grecian colonies, few such tangible vestiges remain. We have, it is true, had carefully transmitted down to us the imperishable professional writings of Hippocrates and others of the purely Greek school; but time has spared few, or indeed almost no, material remnants of the professional instruments or vessels used by the ancient Greek surgeons and physicians.

Perhaps the great rarity of such archæological remains may serve as some apology for the present notice of some specimens of ancient Greek medical vessels or vases. Besides, the vases which I wish to describe are interesting in other points of view. They are all of them intended to contain one and the same drug, as shown by the inscriptions on their exterior. This drug was derived by the ancient Greeks chiefly from Hindostan,—one of the many points of evidence of the former freedom and frequency of the traffic between the south of Europe and India; and at the present day the same drug is still employed extensively and successfully by the native practitioners of the East, for the very purposes for which it was, in former times, used by the medical practitioners of Greece.

The drug to which I allude is the *Indian Lycium* or *Lykion*, the ΛΥΚΙΟΝ ΙΝΔΙΚΟΝ of Dioscorides. In modern collections and writings, I know of four ancient vases or drug-bottles intended to contain this valued eye-medicine. If our museums, however, were properly searched, perhaps various other Greek vases, for the same or for similar medicines, would be detected. The four specimens of bottles or vases for *Lycium* to which I have adverted are the following:

1. In the collection of Greek antiquities contained in the British Museum is a small vase, made of lead, and of the exact form and size represented in fig. 1. The vase is of a sub-ovoid form, and is somewhat above an inch in height, and about three-quarters of an inch in breadth. An inscription, preceded by the ornament on a small tripod, encircles the middle of the vase. The inscription is in Greek letters, of which the following is a correct copy:

ΛΥΚΙΟΝΠΑΡΑΜΟΥΣΑΙΟΥ

This inscription may either be read as ΛΥΚΙΟΝ ΠΑΡΑΜΟΥΣΑΙΟΥ—the *Lycium*

of Paramusaeus—as suggested to me by Mr. Birch, who first had the kindness to direct my attention to this vase; or, and perhaps more correctly, it may be rendered ΛΥΚΙΟΝ ΠΑΡΑ ΜΟΥΣΑΙΟΥ—the *Lycium* sold *by Musaeus*. Mr. Birch informs me, that he thinks he met with the name of *Paramusaeus* as a medical practitioner in Fabricius' "Bibliotheca Græca." I have not been fortunate enough to detect the name in question, notwithstanding some considerable search through that learned work. On the other hand, the name of *Museus*, or *Musaeus*, is well known in Athenian biography. (See Fabricius' Bibliotheca, vol. i., pp. 120-133.) I should, perhaps, have already stated, that the vase in question was sent to the British Museum among a collection of antiquities from Athens.

2. Through the kindness of M. Sichel, of Paris, I am enabled to give in fig. 2, an engraving of a second *Lycium* jar, not hitherto published, of nearly the same dimensions as the specimen contained in the British Museum. This second specimen is not made of lead, but of pottery-ware. It bears upon its side the inscription :—

ΗΡΑΚΛΕΙΟΥ
ΛΥΚΟΝ

This inscription—"the *Lycium of Heracleus*"—has the word ΛΥΚΟΝ spelt without the Ι; errors of this kind being, as is well known, very common in old Greek and Roman letterings.

3. M. Millin, of Paris, published, nearly forty years ago, an account of a similar vase, found at Tarentum, a well known Greek colony and settlement. ("Description d'un Vase trouvè à Tarente." Paris, 1814.) This vase is slightly larger than either of the above, but somewhat mutilated. It is made of clay, and has on its front, in Greek letters, the inscription *Lycium of Jason.*

ΙΑϹΟΝΟϹ
ΛΥΚΙΟΝ

The form and size of this jar are represented in fig. 3. M. Millin fancied, that probably this small vase or jar was intended as a child's toy; but two years after he wrote, M. Tochin d'Anneci gave an account of a similar jar, and first suggested that it must have been destined to contain a collyrium or an ointment—*destinè a contenir un collyre ou un onguent.* See his "Dissertation sur l'Inscription Grecque, et sur les Pierres Antiques," &c. Paris, 1816.

4. The vase described by M. Tochon is delineated in figs. 4, 5, and 6. It is of the same material, and nearly of the same size, but less mutilated than that previously delineated by M. Millin. It presents also in front the same inscription (see fig. 5), namely,—

ΙΑϹΟΝΟϹ
ΛΥΚΙΟΝ

M. Tochon believes further, that this vase was found, like that of Millin, at Tarentum. At least, it was originally given to M. Tochon by a person who had resided for a long time in that city, and who had himself acquired the specimen there. M. Sichel has reason to think it not improbable that his specimen (fig. 2) also came from Tarentum. And it is perhaps not uninteresting to remark, that Galen, Celsus, and various other old medical authors, repeatedly mention a Greek physician of the name of Heracleus or Heraclides, who practised at Tarentum, and was the author of various treatises on the Materia Medica, &c. (See an enumeration of his writings, &c., in Kühn's "Opuscula," vol. ii., p. 156, &c.) Among his large collection of collyria and medicines for the eye, Galen gives formulæ for making different eye medicines bearing the name of Heracleus, as, for example, two "*agglutinatoria pilorum Heraclidæ Tarentini* (Ἡρακλείδου Ταραντινόυ)." See *Kühn's edition of Galen*, vol. xii., p. 741.

The medicine mentioned in the preceding inscriptions, the LYCIUM or ΛΥΚΙΟΝ, was a drug which enjoyed much favour among the ancients; and it was supposed to be possessed of great medical value and virtues. It was used principally as an astringent remedy to restrain inflammatory and other discharges. Dioscorides, Galen, Oribasius, and Paulus Ægineta, dilate upon the medicinal properties of the Lycium. Dioscorides recommends it as an astringent for the cure of various complaints, as obscurities of the cornea, psoriasis, and pruritus of the eyelids,

purulent ears and tonsils, ulcers of the gums, chapped lips, fissure of the anus; in cæliac and dysenteric affections, both in draughts and clysters; in hæmoptysis and coughs; in female fluxes, hydrophobia, and so forth. The Indian variety, he states, cures inflammation of the spleen and jaundice, prevents menstruation, purges water, and is a counter-agent to deadly poisons. (*Dr. Adams' Trans. of Paulus Ægineta*, vol. iii., p. 234.) Two varieties of Lycium were in use, one obtained from Lycia and Cappadocia, &c., and the other from India. The latter was regarded as by far the most valuable. Thus, when treating of the two varieties of Lycium, Galen mentions the Indian as the most powerful for all purposes—το Ινδικον ἰσχυροτερον ἐστιν ἐις ἁπαν. (*De Simp. Medicam.*, lib. vii., 64.) Such late writers as Paulus Ægineta, Ætius, &c., allude also to the superior value of the Indian variety. For instance, in Roxarius' edition of Oribasius it is stated, that the Indian Lykion "præstat ceteris et est efficacius." (*Medicin. Collect.*, lib. xi.) Avicenna, the celebrated Arabian physician, who gives a long account of the medical uses, &c., of Lykion, remarks, "Magis vincens, secundum existimationem, est quod Indicum est," &c.; and he compares its properties with that from Mecca. (*Canon Medicinæ*, lib. ii., cap. 398.)

Of all the uses to which the Lycium was applied in medicine, by far the most important was the employment of this drug, and particularly of the Indian variety, as a collyrium or local application to the eye, in the treatment of different varieties and forms of ophthalmic inflammation. Thus Scribonius Largus, the reputed body-physician to the Emperor Claudius, and one of the most original among the ancient medical writers, declares that "he attributes to no collyrium whatever such great efficacy as to the genuine *Indian Lycium* used by itself. For if," says he, "near the commencement of ophthalmia, any one anoints himself with this collyrium, he will immediately—that is, on the same day—be freed from present pain and future swelling. It is unnecessary (he adds) to dilate on its virtues, for a person experienced only in other collyria would scarcely credit the effects of this simple drug." (*De Composit. Medicamentorum*, cap. 3.) Marcellus lauds its powers in nearly the same words. (*De Medicam., Lib.* cap. 8.)

The Lykion, or Lycium, is still used extensively by the native medical practitioners of India, under the Hindoo name of *Rusot* or *Ruswut*. In a learned article on the nature of the λυκιον of Dioscorides, contained in the "Transactions of the Linnæan Society," vol. xvii., p. 82, Professor Royle has shown, that the Indian Lycium or Rusot is an inspissated extract, prepared from the wood or roots of several species of Berberis, as the *Berberis lycium, aristata*, &c., growing on the mountains and plains of Upper India, and principally procured from Nugger-toke, near Lahore.* "On inquiring," says Dr. Royle, "in the shops of the druggists in the bazaars of India, I everywhere learned that both the wood (*dar-huld*) and the extract Rusot were imported from the hills into the plains, and that large quantities continued to be brought from Nugger-kote as well as other places." And he adds,—"The *Rusot* is at the present day procurable in every bazaar in India, and used by the native practitioners, who are fond of applying it both in incipient and chronic inflammation of the eye; and in the latter state both simply and in combination with opium and alum. It is sometimes prescribed by European practitioners; and I have heard that it was found very efficacious by Mr. M'Dowell in the ophthalmia of soldiers who had returned from the expedition to Egypt. I have myself occasionally prescribed it; and the native mode of application makes it particularly eligible in cases succeeding acute inflammation, where the eye remains much swollen. The extract is, by native practitioners, in such cases, rubbed to a proper consistence with a little water, sometimes with the addition of opium and alum, and applied in a thick layer over the swollen eyelids; the addition of a little oil I have found preferable, as preventing the too rapid desiccation. Patients generally express themselves as experiencing considerable relief from the application."

My friend Dr. Wise, the author of that learned work "Commentaries on the Hindoo System of Medicine," some time ago brought to Scotland with him a small

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* The other variety of Lycium, described by Dioscorides as procured in Asia Minor (Lycia, Cappadocia, &c.), is now generally supposed to be an extract from the *Rhamnus infectorius*, or other species of *Rhamnus*. See Professor Royle, in *Linnæan Transactions*, vol. xvii., p. 87; Dr. Adams, in his admirable edition of *Paulus Ægineta*, vol. iii., p. 234.

quantity of the Indian Lykion. I have seen one or two cases of recent conjunctival ophthalmia treated by the application of this Lykion, with speedy relief and cure. Dr. Wise has been so good as to furnish me with the following interesting letter regarding his own extended experience with it:—

"The use (says Dr. Wise) of the mixture of Lykion or Ruswut is very generally known over Hindostan, where diseases of the eye are common, and probably over Asia and Africa, if we are to believe that this was the black application employed with such success to the diseased eyes of our soldiers in Egypt. It is likewise probable that Dioscorides obtained it nearly two thousand years ago from the East, where the plant is indigenous, and introduced it into Europe. Having found great personal benefit from the application of the mixture of Lykion to my eyes when inflamed, I employed it extensively when Superintendent of the Eye Infirmary, Calcutta; and so convinced was I of its efficacy, that I brought a supply with me to Europe with the intention of bringing it to the notice of the profession. I found you investigating the subject, and at your suggestion Dr. Walker was so kind as to try the medicine, and I am sure will inform you of the results he saw derived from its use. The Indian mixture consists of equal weights of Lykion and burnt alum, with half the weight of opium. These ingredients are mixed with lemon-juice, and reduced to the consistence of cream, and applied round the eyelids and over the eyebrow of the inflamed eyes. This mixture is washed off, and again applied twice in twenty-four hours; and it was only when accompanied with fever that aperients and other parts of the antiphlogistic regimen were required. In less urgent cases the mixture was only applied at night, and produced no inconvenience, unless when it dried, and the lids felt stiff, when it was softened by applying a little moisture. I found the Lykion mixture most useful in all cases of inflammation of the external tunics of the eye. When both eyes were inflamed, it was interesting to mark the advantage this simple remedy had when applied to one eye, while the usual remedies of leeches, blisters, &c., were applied to the other eye. Another most important application of the Lykion is when the ophthalmia is accompanied with severe pain. On such occasions, after applying the mixture, a piece of live charcoal (*gool*) produced the most soothing effect when approached near the eye. With this intention, the charcoal was placed upon an earthen cup, and held on a wooden stand by the patient, and he approached or withdrew it from the eye according to his own feeling. The great relief in this case was in part from the anodyne effect of the opium."

Mr. Walker has kindly given me the following note of his experience with the Lykion at the Edinburgh Eye Dispensary:—

"I have used (he writes me) the Indian Lykion in a considerable number of cases of eye disease. The affections in which I found it most useful were those of the conjunctiva, such as the simple, catarrhal, and pustular forms of inflammation. In them its action was well marked and beneficial, the disease generally subsiding in a day or two; sooner perhaps than it would have done under the ordinary treatment. I have had no opportunity of trying it in purulent ophthalmia; but I believe that in it also it would prove of service. Cases of slight rheumatic and catarrho-rheumatic inflammation have been benefited, but not cured, by it alone. In some affections of the eyelids, as ophthalmia tarsi and chronic ophthalmia, it did good; but such cases often get well with very little treatment. I applied it to the eyelids in the form of a paste, with opium and burnt alum, as recommended by Dr. Wise. This was repeated two or three times a day. The patients generally complained of a burning and smarting of the lids after its application, similar to what is produced by a mustard blister."

The four ancient Greek vases, mentioned in the preceding notice, as inscribed with the name of the drug *Lykion* or *Lycium*, are each of very small dimensions, the engraving representing all of them of their original sizes and forms. They are small, in consequence, in all probability, of the foreign drug which they contained being difficult to procure in large quantities, and being hence an article of high price in the markets of Greece and Italy. The value set upon the contained drug would seem to be indicated by another circumstance—namely, by the shape of the interior of the vases. In the specimens described by Millin and Tochon, the cavity of the jars is narrow and conical from above downwards, the mouth being wide, and the interior becoming more and more tapering and contracted as it descends downwards. The section of the interior of the vase of Tochon, given in fig. 6, represents this peculiar and deceitful form of the cavity. In consequence of

this peculiarity in their form, these jars contained, in fact, much less of the Lykion than their mere external appearance indicated. This remark, at least, holds true of the two vases from Tarentum bearing the name of *Jason.* The vase of *Museus* from Athens, belonging to the British Museum, appears more honest at least in its construction. The high price of the pure Lykion probably led also to the fact mentioned specially by Dioscorides (lib. i., cap. 133), Pliny (lib. xxiv., cap. 14), and Serapion (lib. ii., cap. 398), of the frequent adulteration of the drug. And, perhaps, as in similar inscriptions on some modern medicine-nostrums and packets, the names of the preparer or vendor, *Jason*, *Heracleus*, and *Museus*, stamped on the vases, were added in attestation of the purity and unadulterated character of the drug which these vases contained.—*Monthly Journal of Medical Science.*

VEGETABLE WAX FROM THE CANDLEBERRY MYRTLE.

BY P. L. SIMMONDS, ESQ.

As it is highly desirable to increase our supplies of useful articles from every available source, and the berry-wax obtained from the *Myrica cerifera* seems calculated to be of use to our manufacturers, when employed in conjunction with other solid fats, for making candles, &c., I am induced to ask you to give extended publication in your pages to some detailed information as to the best mode of propagating and cultivating the shrub, of collecting the berries, and preparing the wax.

This myrtle abounds in Louisiana, New Brunswick, and other parts of North America, in the Bahama Islands, and in the Cape Colony, and if attention is more prominently directed to it, the wax could soon be obtained in considerable quantities. Myrtle-wax differs in many respects from bees-wax, assuming shades of a yellowish-green colour, and when fresh, emitting a fragrant balsamic odour. It has in part the unctuosity of bees-wax, and somewhat of the brittleness of resin. Its specific gravity is greater, insomuch that it sinks in water, whereas bees-wax floats upon it, and it is not so easily bleached as to form white wax.

A prize medal was awarded for some specimens forwarded to the Great Exhibition from the Cape of Good Hope, and in consequence of the favourable opinion expressed of the wax, a consignment of 2561lbs. of the wax was shipped to England in 1852, which, after payment of all expenses, collecting, shipping, &c., netted clear £54 4*s.* 5*d.*

The myrtle shrub or bush produces a small green berry, of the size of a pea, covered with a bluish powder, which, like the hog-plum of the West Indies, puts out from the trunk and larger limbs.

The Cape of Good Hope Agricultural Society, of which I am a corresponding Member, have devoted much attention recently to the obtaining and diffusing information respecting the plant and the manufacture of its product, and the following are some of the communications which have been submitted to it.

ON THE MYRICA, OR WAX-BERRY PLANT, OF SOUTH AFRICA.

The following account is taken from two papers, one by Mr. Feeney, of Cape Town, and the other by Mr. Bowie, for which prizes were awarded by the Agricultural Society of the Cape of Good Hope. Mr. Feeney's paper is dated 15th of September, 1853, and Mr. Bowie's appears to have been communicated about the same time. Both papers were published in *The South African Commercial Advertiser and Cape Town Mail* of November 10th, 1853.

Of the genus *Myrica*, or wax-berry, there are five species and two varieties (described in various botanical works), which are indigenous in S. Africa.

The genera *Myrica* ranks in the natural arrangement of plants, in the order *Amentaceæ*, and sub-order *Myraceæ*. And, in the sexual system of Linnæus, in *Classis* 21, *Monœcia*, section 2. *Diclinia, Ordo*, 4, or *Tetrandia.*

Character of the genus Myrica. *Flowers* unisexual, monœcious or diœcious, arranged in katkins. *Scales* of the katkin, single-flowered, concave. *Stamens* 4.

Styles 2. filiform, *Drupe* 1-celled, 1 seeded, covered by waxy scales. *Sprengel Gen.* No. 583. *Harvey, S. Afr. Gen.* p. 309.

Description of S. African species—

1. *Æthiopica*, M., leaves in form elliptic, toothed on the margin towards the point, margin at the base entire (*i. e.* not toothed).

Note.—Of this species, two varieties have been alluded to in published works. Of the present species a figure, table 48, figure 8, appears in *Plukenet's Phytographia*, Londinii, 1691—1705, 4to.

2. *Serrata*, M., leaves lance-shaped, attenuated towards the point, sharply serrate, hairy. Katkin bisexual, scales egg-shaped, pointed. *Habitat*, common on all soils. in the Cape district.

Note.—A figure of this species is given in *Joh. Burnanni, variorum, Africanarum Plantarum, Decades* 10. *Amstelædami*, 1738, 1739, 4to.

3. *Quercifolia*, M., leaves oblong, bluntly-waved margin, the young branches downy, *i. e.* having a velvety or cottony appearance. *N. J. Jacquin, Fragmenta Botanica, Fascic.* 2 *tab.* 1, fig. 4.

Note.—Of this species there are two varieties cultivated in the British gardens, differing only from each other in one of them being slightly hairy in the leaves.

Habitat.—Sandy soils of the Cape district, and S. E. coast.

4. *Laciniata*, M., leaves oblong, linearly divided from the margin towards the mid-rib in a feather-like manner. The younger branches covered with resinous punctures. *Katkin and rogynous* and solitary, scales blunt. *Habitat*, principally in the George District.

5. *Cordifolia*, M., leaves somewhat heart-shaped (margin serrated), sessile, closely produced, so as to be somewhat imbricate.

Of this species, there are also two varieties, one being entire (or smooth) on the margin of the leaves. Pluk. ph. t. 319, fig. 7.

Habitat, Cape Flats, &c. *N.B.* In former times, very abundant about Muizenburg, xxx. MS.

In addition to the foregone recorded species, six or seven other species and varieties were collected above thirty years ago, in the districts of Swellendam and George, and of which no descriptions have been made public.

The soil most congenial to the growth of Myrica, is that of a sandy nature, dark in colour, from the vegetable matter which it contains, but such is the nature of this and many other South African *genera*, that they appear to thrive in soils and situations of very opposite character, and to be equally productive on loamy sand, as they would on the lighter and richer bog earth. In the latter, if very moist, and insufficiently drained, the plant would be injured by the stagnant moisture.

The first species on the list No. 1 is met with both on stiff and light soils, and more frequently than the others, in rocky situations.

No. 2. *Serrata*, generally on level ground, and all descriptions of soil.

No. 3. *Quercifolia*, in like situations, very frequently with No. 2.

No. 4. *Laciniata*, more commonly on sandy loam or clay soil.

No. 5. *Cordifolia* affects a more moist soil, although to many persons it appears to grow well on the purest sands, as may be observed on some parts of the Cape Flats; but this is owing more to the age of the plants, having in the first instance vegetated in a better soil, the sand afterwards accumulating by degrees about their stems, keep the roots cool and comparatively moist, enabling the plant to resist the drying heat of the atmosphere, and extend both root and stem in all directions; the atter generally forming new roots contribute to the support of the plant.

REARING, PLANTING, &c.

The *M. cordifolia*, producing the largest berry, is the species recommended for culture as being the most profitable in crop, but also in the character of growth, its spreading branches more rapidly covering the ground than any of the other species.

In the months of April or May, prepare substantial boxes of twelve inches in width, and the same in depth, inside measure, and of any convenient length, perforating the bottoms with small holes, covering them with gravel or small stones to the depth of two inches, then filling the boxes to about one and a half inch of the tops with black vegetable sandy soil, or with a mixture of decayed (two years old) leaf mould and of sandy loam in equal parts. Sow the berries thickly on this, and cover them with half an inch of soil, pressing it smoothly down, and thus leaving a

space of about one inch for the reception of rain, or the occasional watering required in dry weather.

The boxes to be placed in a shaded situation from the sun, but not under the shade of trees, as the plants would be drawn up weakly. The soil should be kept moderately moist, and as equally so as possible ; alternate extremes of drought and moisture check and injure the protruding radicle of the seed. The seeds will, if fresh, vegetate in about three weeks or a month, and as the young plants appear above ground, they must be kept free of weeds, and occasionally supplied with water.

When the plants are about twelve months old, they ought to be large enough for planting out, and this should be effected during the months of May, June, or July, as the most likely season to ensure success. On planting out at this season, they may be placed in patches of three plants each, the patches to be not less than four feet, nor more than nine feet apart, patch from patch. If the ground to be planted should be very sandy, or entirely so, holes may be dug out at the proper distance, and filled in with at least a cubic foot of earth, similar to that used in the boxes, tramping the same firm before the plants are inserted ; and unless showery weather happens at the time of planting, it will be necessary to apply water by hand.

If boxes are not made use of, the ground to be occupied may be prepared in patches as above, and the seeds sown at once, placing about a dozen of the berries in each patch, keeping the plants free from weeds, and thinning and regulating at the proper season such plants as are to remain.

On better soil, and such as can be prepared by the plough, the seeds may be dropped thinly into drills drawn at from six feet to nine feet apart, and at the same time might be sown with rye; this would shelter the *Myrica* for a time, but as the rye would require manure, and which is generally used in a fresh state, or nearly so, it would injure the *Myrica*, and no *experienced* person would risk the trial. To sow the berries broad-cast would be a waste of seed, and cause infinite labour hereafter to thin the crop to a proper distance.

The *Myrica* may be also propagated by layering the one or two-year-old branches, and by cuttings of the young ripened wood. The first mode would strike root the most readily, but be more troublesome and less efficient than raising the plant from seed.

As for gathering the crop when at maturity, the best way is to spread a sheet or cloth under the shrub to collect any berries which may fall while gathering the principal part by hand, a labour which may be performed by children or by the aged or infirm. Thirty-seven years ago, much of the shrub was destroyed from the Cape Flats by tearing them up root and branch, and carrying them off the ground by waggon loads, losing much of the berries by carrying, and destroying for the future. This very reprehensible practice was checked by the then Governor, Lord C. H. Somerset's proclamation forbidding the practice.

As to bleaching the wax, it is supposed that beyond a second boiling, in pure water, it would not answer the grower or the collector's purpose, or remunerate him for extra trouble. A further bleaching may be effected by melting and drawing the wax into thin strips and exposing them to the atmosphere. Another method is, by letting the melted wax fall upon a large wooden cylinder, one half of which revolves under pure water, causing the wax to form thin flakes, which are afterwards exposed to atmospheric action. Various trades have their own chemical modes of purifying both bee and berry wax, but with which the writer of this paper is not sufficiently acquainted to give sufficient information, and therefore pens only the results of experienced knowledge.

SOILS AND SITUATIONS IN WHICH IT IS FOUND TO GROW MOST LUXURIOUSLY.

The soil in which I find the wax-berry plant, or bush, most luxuriant, and the berries largest, is a mixture of marl or pot clay, in appearance as sub-soil, with more or less sand on the surface. This soil is always soft and damp to the foot, whether clothed or not, by the presence of "brack-water" all the year round, either on or close to the surface. It is strongly impregnated with salt, and abounds in decayed marine animalculæ, clearly indicating a recession of the sea not many ages hence. The situation being along the sea-shore, and of course within the influence of the sea-breeze, which, it would appear, is salutary to the growth of the plant in its

native state. And although it may be found in other situations, especially amongst rocks and stones of the limestone kind, a considerable distance from the shore, still the sub-soil by which the roots are nourished partakes more or less of the quality above described. Wherever a wax-berry bush is found, water in some quantity may be found under its roots ; and although the bush may be seen on the top of a high mound or hill, yet its roots have their hold in the wet soil—the elevated position of the bush having been the result of a partial drift some time previous. Fresh water may also be found under the roots of many bushes; but in such localities, though the bushes may be plentiful, the berries are generally small and scarce, and seldom considered worth the gathering.

THE BEST MODE OF PROPAGATING AND CULTIVATING IT.

It may be propagated anywhere in sandy ground where the water does not recede too quickly in summer for the roots to follow it, and where sufficient vegetation already exists to cover the berries from view of the birds, by merely strewing them over the surface. The first shower of rain will do the remainder, providing the sand be soft, and the sub-soil suitable. But to cultivate it by breaking up ground is another thing, and will be expensive in the outset. For this purpose something must be sown with the berry to screen its shoot when it appears over the ground from the birds. Most birds common to the flats live upon it, especially the spreeuw and kwikstaartje ; the former pick it from the bush and ground when it falls off, the latter pluck the tiny shoot out of the ground as soon as it appears on the surface, no doubt expecting something eatable to turn up with its root.

Pyp grass seed should, therefore, be prepared for the purpose; it is the only grass on the flats whose seed can be gathered in any considerable quantity, and grows best, like the wax-berry bush, in saline soil. When it is the object to sow largely, and where the ground is pretty level, it may be prepared the same as if for any of the cereal grains, with the exception that it may be necessary to harrow twice. After ploughing, and manure and grass seed are strewn over, harrow deep, crosswise, in order to make the field the more even; then strew over the berries, and harrow as light as possible. The less covering the better; indeed none would be needed were it not for the spreeuw, one flock of which would denude acres in a few hours. Or, omit the last harrowing, and let advantage be taken of the first rainy day to strew the berries. The first half-hour's rain will cause them to be sufficiently covered, the ground being soft and loose.

To plant sand-hills the berries should be nursed in pots, boxes, or something portable, and transplanted about the beginning of winter, so as to afford the plants the full benefit of the rainy season; spitting and mixing the sand with rich loam for each plant as far as the spade will admit. By these means, the roots will have penetrated deep enough before the heat sets in to be out of reach of its influence, should the hills not be unusually high above the general level.

In planting sand-hills or flats that may be drifting, or indeed any sand without a considerable share of loam, neither grass seed nor any of the cereal kinds can be depended on as a sufficient protection; a few gusts of wind from the north or south would set the sand in motion before either would be strong enough to bind and cover the surface. Small inexpensive screens should be used for this purpose; any kind of bush or reed will last two years, by which time the vines of the plant will have sufficiently multiplied to protect themselves.

OF COLLECTING THE BERRIES AND EXTRACTING AND PREPARING THE WAX.

Anything hollow, from the size of a plate to that of a schepel measure, placed under the branch with one hand, while the other is employed in rubbing off the berries, will be found the most useful in collecting them from the branches; besides which, every person gathering berries should have a cloth the size of a small handkerchief about his person ; that, where a bush whose vines are partly buried in the sand is met with, the vine may be lifted gently, the cloth placed under, and when the berries are rubbed off, the vine may be replaced without the slightest injury; a muid bag to be kept at hand to receive such small quantities in the mean time. Where berries are found large and abundant, one man can gather two muids a day with ease in this manner; such berries, from being large, would realize 14lbs. of white wax to the muid.

With respect to extracting and preparing the wax, although I have had defecators made since the last Agricultural Show, by the use of which the process of extracting

the wax is simplified; yet, for the benefit of parties who may not wish to incur the expense of such articles, I will here explain the process by which the best specimen of wax then exhibited was got up.

A small quantity of berries at a time was put into a pot of boiling water, so proportioned to its size as to admit each berry to have cast its wax to the surface. This small quantity was not in the water more than two minutes when skimming commenced, the berries being stirred gently with a ladle during that time. The wax was then skimmed off rapidly, to avoid the colour from the pulp. To receive the skimmings, a small keg, with one end out, was prepared; over this end two flannel strainers were fastened, through which the wax was strained, and when the keg was full, the wax being yet a liquid, was again strained through flannel into a mould that gave it shape. After each skimming, the boiler, being too large for removal with facility, was baled of its contents, water and all, cleaned with mops and hot water, re-filled with water, either cold or otherwise, and the fire applied with all despatch.

This having been performed in the open air, an hour was often consumed between each process in getting the water up to boiling heat, while the process itself did not occupy more than five minutes from the time the berries were put into the boiler until the skimming ceased. To save so much time and labour, the necessity for something with which to enclose the berries in the boiler became apparent; hence the construction of the defecators alluded to.

There are two of them: they will be sent for the inspection of the members. The brass defecator is adapted to the berries towards the close of the winter, when the pulp is dry. The pulp, being then brittle, will break into small particles in the water, and float to the top with the wax. It was found more difficult to sever such particles by straining than it was to avoid the colour by despatch; the decayed pulp conveying a darkish, and the juice of it a greenish colour to the wax. The other defecator is adapted to the berries in their season. It is of iron wire, and has a dash. The berries, when sound, well winnowed, and picked, will admit of their being tossed about a little, either before or when full ripe. The vanes of the dash are so shaped as, when set in motion, to hitch the berries in succession towards the surface of the water, thus affording additional facility for each berry being rid of its wax. The application of either of these instruments with a brass strainer and cock fitted to a mould (that will be produced at the same time), will save four-fifths of the labour and time lost in preparing water, gathering fuel, baling, mopping, and straining, as described in the former process. In working either, one minute and a half will suffice for its immersion with the berries in the boiler; more time than this will extract the juice and discolour both the wax and the water. The dregs and other substances that may have escaped in cleansing being retained by the defecator, some warm water should be at hand in which to rinse it after every second or third immersion. By attending to this particular, and to the time above specified, the same water will answer all day, replacing that, of course, which was taken out with the wax in skimming.

The wax being the produce of the pulp, it is to be observed that the latter will retain more or less of the former until the berries are quite ripe. To ascertain this, let the berries remain in the water some time after skimming, and should any wax appear, it will be of the colour of the juice, and will show at once that the berries are not ripe. However, as wax so made is objectionable only from its colour, and is valuable to the farmers and their servants, it may be procured by a second skimming until the berries are seasoned—care being taken that such skimmings are put into a separate vessel from that in which the first skimmings are deposited. These remarks are applicable to parties who, having commenced making wax at a distance from their homes, may not find it convenient to return and wait for the proper season.

I will conclude with remarking that I have not found all the bushes in any locality bearing berries the same year, and the coarsest kind have not borne at all during the last five years, while others have borne yearly. This would indicate sexual properties: yet, whilst admitting the possibility of such qualities, I am aware that a large portion of bushes are barren, both from age and from an unfavourable position —having had berries at Deep River in 1850 from bushes that have not borne since, and having found the berries in my own neighbourhood drop from the bushes before attaining half the usual size, year after year, some of them not even appearing larger than pin-heads.

I have not found the plant bear under the fourth year in any situation.

Frost, should it happen any time during the season, will cause the berries to drop from the bushes and disappear.

The defecators should have been larger;—the makers (Messrs. Fell) would, I have no doubt, have made them neater and better adapted for the purpose had they been instructed by a person of some ingenuity. With a defecator about a fourth larger than the iron one, two men would realise 100lbs. of white wax a day; and as the average quantity of wax in a muid is 11lbs., the average work of a picker $1\frac{1}{2}$ muids a day, it will be seen that six men picking from the bushes would be sufficient to keep the two men defecating supplied with berries. The expense of labour, carriage, &c., would not exceed eighteen shillings per 100lbs.—about twopence the pound. I have been particular in making this estimate. The berries, I may add, are none the worse for sowing by being stript of the wax in the defecator: it improves them.

ON XANTHOXYLINE, A NEW CRYSTALLINE PRINCIPLE FROM JAPANESE PEPPER, THE FRUIT OF THE XANTHOXYLUM PIPERITUM OF DE CANDOLLE.

BY JOHN STENHOUSE, LL.D., F.R.S.

A FEW months ago I received from my friend Daniel Hanbury, Esq., a small quantity of a very singular fruit from Japan, known in commerce as Japanese pepper. Mr. Hanbury likewise kindly furnished me with the subjoined botanical account of the tree from which it is obtained.

"Japanese pepper is the produce of *Zanthoxylum piperitum*, De Cand. (*Fagara piperita*, Linn.), a tree of Japan of the natural order *Rutaceæ*, figured and describe by Kæmpfer in 1712.*

"It consists of roundish sessile capsules of the size of a peppercorn, which appear to have been normally four in number, situated at the extremity of a peduncle, though but one or two are usually fully developed. The capsules, which are externally reddish-brown, have their outer covering beset with numerous prominent tubercles enclosing an acrid liquid to which the pepper owes its pungent flavour. The seeds are black, shining, and devoid of pungency; from dehiscence of the capsules, they are generally wanting in the sample which we have examined.

"The flavour of Japanese pepper is aromatic and agreeable, with a pungency not unlike that of pellitory (*Radix pyrethri*). Its odour when bruised is remarkably fragrant.

"It is employed as a condiment by the Japanese and Chinese."

The Japanese pepper, after being reduced to a coarse powder, was digested with successive portions of spirit of wine till it was rendered nearly tasteless; the greater portion of the spirit was then drawn off by distillation, and the residue on standing for a few days became filled with dark-coloured crystals of considerable size. Their colour was owing to the presence of a resinous matter, which adhered to them very tenaciously. The best way of removing this dark-coloured resin is to wash the crystals with cold liquor ammoniæ, which dissolves the resin, leaving the crystals unacted on. The crystals were rendered quite white, and were easily obtained an inch in length by repeatedly dissolving them in ether, or in a mixture of alcohol and ether.

Through the kindness of Professor W. H. Miller, of Cambridge, I am enabled to subjoin the following figure and description of the crystalline form of xanthoxyline.

The crystals of xanthoxyline belong to the oblique system.

The angles between normals to the faces, are :—

	°	′
bc	90	0
rb	37	10
rc	52	50
mb	58	50
mc	83	30

Cleavage. *b*, very perfect and easily obtained; *c*, perfect.

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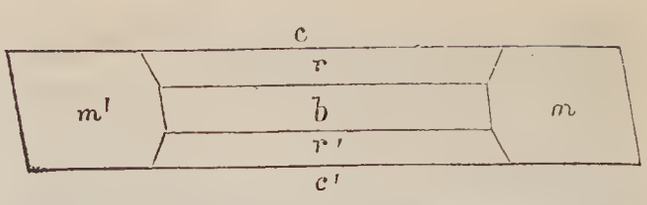
* *Amœnitates*, pp. 892—895.

The crystals are extremely thin in a direction perpendicular to the face *c*.



The faces *r* *m* were so imperfect that the angles they make with *b* and *c* could not be determined with much accuracy.

Xanthoxyline is quite insoluble either in cold or hot water, but it readily dissolves in alcohol or ether. Its solutions are quite neutral to test-paper, and do not appear to possess either acid or basic properties. The crystals of xanthoxyline melt at 80° C. Their taste is aromatic and resinous, not unlike that of elemi or olibanum. The amount of xanthoxyline in Japanese pepper is very considerable. A quantity of xanthoxyline, after being dried at 100° Centigrade, was subjected to analysis in the usual way.

I. 0.179 grm. substance gave 0.401 CO_2 and 0.104 water.

II. 0.1142 grm. substance gave 0.2558 CO_2 and 0.07 water.

	I.	II.
Carbon	61.09	61.09
Hydrogen	6.45	6.8

I subsequently found that xanthoxyline contains a small quantity of nitrogen, the amount of which I was unable to determine from want of material. I confidently expect to obtain in the course of a few months a considerable quantity of Japanese pepper, when I hope to be able to complete its analysis. Notwithstanding that xanthoxyline contains nitrogen, it does not exhibit any basic properties, but in its general properties considerably resembles the so-called stearoptens.—*Philosophical Magazine.*

EXAMINATION OF THE CRYSTALLINE DEPOSIT WHICH FORMS IN OIL OF BITTER ALMONDS.

BY JOHN STENHOUSE, LL.D., F.R.S.

When oil of bitter almonds is kept for some time in loosely-stoppered bottles, a crystalline deposit not unfrequently forms in it, especially if the oil is exposed to the influence of the light. So long ago as 1823, M. Stange declared this crystalline deposit to be simply benzoic acid produced by the oxidation of the oil, a statement which was confirmed in 1830 by Robiquet and Boutron-Challard. (*Ann. de Chim. et de Phys.*, vol. xliv., p. 364.) It does not appear, however, that any of these chemists subjected the supposed benzoic acid to the test of analysis. Subsequently the late Dr. Jonathan Pereira, in the first edition of his *Elements of Materia Medica*, p. 1107, stated that he had met with "three kinds of a crystalline substance from oil of bitter almonds, differing essentially from each other and from benzoic acid." These deposits were examined by Dr. Pereira, and one of them, that marked No. 3, by Dr. Letheby. None of them were subjected to analysis, but they were tested by the action upon them of oil of vitriol, caustic potassa, &c. These crystalline deposits were given to Dr. Pereira by Mr. George Whipple, who kindly furnished me a few weeks ago with no fewer than ten different specimens of a similar character which had formed in as many portions of oil of bitter almonds. The weight of the crystals exceeded three ounces.

The crystals had a deep yellow colour, and were strongly impregnated with oil of bitter almonds. As much of the oil as possible was removed by strongly compressing the crystals between folds of blotting-paper. The crystals were then digested with boiling water, in which they readily dissolved. After repeated solutions and crystallizations, they presented the usual characters of benzoic acid. On analysis, 0.4215 grm. substance dried at 212° F., when burnt in a current of oxygen gas, gave 1.069 carbonic acid and 0.2005 water =

	Calculated numbers.	Found numbers.
14 C	68.853	69.167
6 H.	4.915	5.283
4 O.	26.232	25.460
	100.000	100.000

The silver salt was prepared by neutralizing the acid with ammonia, and then

adding a solution of nitrate of silver. When subjected to analysis, 0.3883 grm. salt gave 0.525 carbonic acid and 0.317 water.

1.1711 grm. salt gave 0.5516 silver.

	Calculated numbers.	Found numbers.
Ag O	50.654	50.533
14 C	36.684	36.909
5 H	2.183	2.317
3 O	10.479	10.241
	100.000	100.000

From these results it is clear that the crystalline deposits from oil of bitter almonds examined by me were simply benzoic acid, and this I have reason to believe was also the case with two out of three samples described by Dr. Pereira; for through the kindness of Professor Redwood, I obtained three small specimens of these deposits from Dr. Pereira's collection, now in the possession of the Pharmaceutical Society. That marked No. 1, I found to be simply benzoic acid. I received also a specimen given to the Pharmaceutical Society by Mr. Whipple; it was also benzoic acid. The specimen marked No. 3, and which amounted only to a few grains in weight, was that examined by Drs. Pereira and Letheby. It consisted of small, acicular, lemon-yellow crystals, which were insoluble in water, alcohol, ether, and acetic acid. Sulphuric acid reddened and then dissolved them, forming a deep yellow solution. They were not dissolved by a solution of caustic potassa in the cold; when heated with it, however, ammonia was evolved, which proved that the crystals contained nitrogen. When the crystals were strongly heated on platinum foil, they melted, and were decomposed, a small amount of sublimate only being produced.

The origin of the crystalline deposit No. 3 is very obscure. Mr. Whipple informs me that he only obtained it on one occasion, many years ago, when the essential oil of almonds was prepared by distillation over the naked fire; but ever since the operation has been effected by means of a steam apparatus, he has never met with it again, and has merely obtained deposits of benzoic acid. I strongly suspect that the yellow insoluble crystals, marked No. 3, were produced by the action of ammonia on oil of bitter almonds, and that the ammonia on that occasion was probably evolved by the charring of a portion of the nitrogenous pulp of the almonds by the overheating of the bottom of the retort. The crystalline deposits which form in oil of bitter almonds must be regarded, therefore (unless in the single somewhat inexplicable instance just stated), as simply benzoic acid resulting from the oxidation of the oil.—*Philosophical Magazine.*

PRODUCTS OF CEYLON.

The following interesting contributions, presented to the Ceylon Asiatic Society by W. C. Ondaatje, Esq., of Badulla, were, on the 3rd December, laid before a meeting of that Socitey:—

1. Two pounds of *Gum Kino*, the produce of the *Pterocarpus Marsupium*, Roxb., which grows abundantly at Badulla and its neighbourhood.

With reference to this important substance, the Secretary remarked, that in appearance and in properties it resembled the kino of commerce which is so largely used in medicine and the arts, and would no doubt be as readily purchased in the markets of Europe as that exported from India, if it could be produced in any quantity; up to the present date only 9lbs. have been sent to the Society, all which has been forwarded to Messrs. Dawson and Co. for transmission to England to ascertain its market value. The reason why the quantity is so small is explained in the following extract from Mr. Ondaatje's letter of the 25th November, 1853:—

"Regarding the gum kino, I regret to say that I have hitherto been baffled in my attempts to secure the services of a native Singhalese who would undertake to collect a cwt. of the gum. The people are very averse to the performance of any work which is novel to them in character, and which requires any degree of energetic perseverance, or the real object of which they do not quite comprehend.

"Under these circumstances, I would suggest to you to apply to Government to instruct the Government Agent to direct each headman to collect quantities of the gum from the trees in the villages under his charge. If the fluid gum is sent to me

I will have it properly dried and sent to the Society. The trees are just now in blossom; and as at this time the gum flows in greater abundance, it would be a pity to let this year pass over without making an effort to collect at least two cwts.

"I will send all the gum I have hitherto collected, which is only nine pounds.

"Yours, &c.,

"W. C. ONDAATJE."

Mr. Buller considered the best means of forwarding Mr. Ondaatje's views, would be to communicate the wishes of the Society, through him, to the Assistant Government Agent at Badulla; in which the meeting gladly acquiesced, and requested the Secretary to supply Mr. Buller with any information on the subject he may require.

2. A sample of *Gum* produced by the satinwood-tree; in appearance it resembles gum Arabic.

3. A sample of *Gum* produced by the ebony-tree. It is in small rounded nodules, partially transparent, when not coloured black with the same colouring matter that gives the wood its chief characteristic; its taste is insipid.

4. A sample of *Gum* from the *Terminalia alata*. In appearance it resembles dark coloured gum Arabic, but it appears to be a harder and more tenacious gum than the latter; its taste is also insipid.

5. *Black Resin*, the produce of a tree growing in the barren soil of Badulla, *Semecarpus obovatum*, Moon, the *Kalu Badulla gaha* of the Singhalese. It is of a pure black colour, resembling black sealing-wax, of very light specific gravity, and tasteless. It is soluble in turpentine.

6. A black substance, which Mr. Ondaatje describes in the following letter:—

"*Badulla*, 29*th November*, 1853.

"Herewith I enclose a few insects, and a black substance deposited by them on the *Gyrocarpus Jacquini*, and shall be glad of any further information you can give me regarding them. The Singhalese call the substance 'Kadde pas,' and use it as an external application in cutaneous affections of the legs."

The Secretary regretted that he could give no further information regarding this substance than that contained in Mr. Ondaatje's letter, not having had time to make a minute examination of the insects, which do not appear to be Aphides, but rather closely resemble the Ichneumonidæ; at the next evening meeting the results of a close examination will be detailed.

7. *Lac.* The Secretary stated that the sample before the meeting was the produce of the *Coccus Lacca*, an insect which produces two very valuable articles of commerce, namely, shellac and lac dye, both which substances are largely consumed in the arts and manufactures in Europe; it is extensively exported from India, but as it is described as being abundant in Badulla, there is every prospect of its becoming a valuable article of export from Ceylon also.

The lac belongs to the same class and order of insects as the cochineal, and whilst the latter only produces crimson dye, the former produces the substance called shellac as well. On macerating a portion of the sample before the Society in hot water, the crimson colour was seen to be imparted to the water, while the shellac floated on the surface, and became quite soft and pliant. The colouring matter is altogether derived from the bodies of the insects which reside in the cellular structure of the substance, as it is found on the tree; it is this cellular substance, which appears to be useful in protecting the insect from ants and other enemies, that yields the shellac.

It would be well worth while to draw attention to the cultivation of the lac instead of the cochineal insect; as the plants productive of the former—the *Gyrocarpus Jacquini* is one—as well as the insect itself, are already abundant in the jungle, whilst the cochineal plant and insect are still strangers to the soil and climate of Ceylon.

Sulphur stone, described by Mr. Ondaatje as follows:—"I have now the pleasure of submitting the accompanying specimen of sulphur stone, and shall be glad to be favoured with your opinion."

"Sulphur exists in bintenne, in combination with iron pyrites, in great abundance."

The specimen submitted to analysis yielded but a small percentage of sulphur; it also contained arsenic in greater quantity than sulphur, the other constituents being graphite in isolated granules, imbedded in quartz and mica.

HYDROCOTYLE ASIATICA A CURE FOR LEPROSY.

(*From the Madras Gazette.*)

We mentioned in our last that M. Jules Lépine, a medical officer of the French Government, who has administered with success the *Hydrocotyle Asiatica* for the cure of leprosy at Pondicherry, has put himself in communication with the medical authorities at Madras, who have entered into M. Lépine's views with a promptitude and alacrity worthy of their profession, and have already commenced employing *Hydrocotyle Asiatica* at the Leper Hospital. The plant is, we understand, to be found in abundance about the presidency. As the subject is of much importance, and our medical friends in the Mofussil will be anxious to obtain information regarding the employment of *Hydrocotyle Asiatica*, we give the substance of M. Lépine's paper, which appeared in the *Moniteur Official* of the 26th August, as follows:—

Dr. Boileau, of the island of Mauritius, who had been afflicted with leprosy for many years, having in vain tried every known remedy, had separated himself from society, and was awaiting death to terminate his sufferings, when he happened to hear mention of an American plant named *Chinchunchulli*, which was declared to be a certain remedy for the disease, and he immediately took steps to procure it, though at the same time bitterly regretting that the plant was not indigenous to the Mauritius.

Amongst other distinctive botanical characters of the *Chinchunchulli*, it is remarkable for its stringy, rounded leaves, analogous to those of the violet; and Dr. Boileau happened to be one day walking in his garden, oppressed with the wretched thought that the American specific would arrive too late to be of any service to himself, when he beheld at his feet a plant whose leaves were similar to those of the one that he was awaiting, and he hastened to gather it. Before, however, making known his discovery, he tried its effects upon himself, and having experienced a sensible improvement in his health, he gave the plant the name of *bévilacqua*, and administered it to twelve lepers. The results of this experiment having fully answered Dr. Boileau's expectations, he hastened to publish a letter in the *Cerneen*, under date 9th December, 1852, in which he made known the good effects obtained in the treatment of leprosy by the administration of *bévilacqua*, but did not then state whether his plant was the *Chinchunchulli* of America. The above number of the *Cerneen* only arrived at Pondicherry about the end of February, 1853. "On reading it," says M. Jules Lépine, "it immediately struck me that the plant which Dr. Boileau had found could not be the American one, by reason of certain laws recognised by botanists for the geographical distribution of vegetable productions, but that it might be *Hydrocotyle Asiatica*, whose leaves have nearly the same form as those of the violet;" and M. Lépine just then met with a Reunion Journal, which had republished Dr. Boileau's article, wherein, on the authority of M. Richard, it was declared that the plant there designated by the name of *bévilacqua* must be *Hydrocotyle Asiatica*. Strong in this evidence, M. Lépine proceeded in search of the plant, which he found without difficulty, and he then called the attention of the faculty to a remedy which offered them, according to its discoverer, a chance of curing a disease which, till then, had resisted all known curative means.

M. Jules Lépine then proceeds to observe, that although a medical man cannot be too careful in the employment of new medicines of doubtful virtue, yet the case is altogether different when he encounters a disease that is supposed to be incurable, as it then becomes his professional duty to make trial of every medicine that he hears of as curative or palliative of a malady which has hitherto baffled all his professional exertions.

M. Lépine, in making known the value of *Hydrocotyle Asiatica* to the other members of his profession, acquainted them that they would find the plant in every form of preparation—dried, in powder, in syrup, and in ointment—at the Government Dispensary; for although Dr. Boileau had not given the formula of his preparations, yet, guided by analogy, he had not hesitated to prepare medicines with *Hydrocotyle*; and an experience of five months proves that his preparations are identical, as to their effects, with those of M. Boileau. M. Poupeau commenced administering *Hydrocotyle* on the 3rd, and M. Houbert on the 11th March, and M. Collas on the 17th June. A tolerably large number of sick were the objects of

these experiments. At their termination, the results obtained, as well in leprosy as in other diseases, will be made known.

Subsequently to Dr. Boileau's letter of the 9th December he published several others, as experience showed him that his treatment required to be modified. In his first letter he prescribed *Hydrocotyle* in powder, commencing with one gramme (about fifteen grains English), and increasing the dose to four grammes; and, from one to four spoonfuls of the syrup. He directed that each dose of powder should be diluted in a glass of hot wine, with sugar, or in a cup of tea; the patient to wear warm clothing, take nourishing food, but to avoid that of a farinaceous description. He also advised regular exercise, morning and evening, and a purge to be taken every eight or ten days, with sulphureous or salt-water baths.

In his letter of the 22nd December, Dr. Boileau slightly modifies his treatment, recommending that the syrup should be administered to infants only, and the powder to patients of ten years of age and upwards; the ointment to be rubbed in on the edges of the sores. But Dr. Boileau again still further modifies his treatment considerably, in a letter of the 2nd March, in which he prescribes *Hydrocotyle* to be taken in ptisan.

1stly. Ptisan of *Hydrocotyle* to be taken for three weeks; two ounces of the dry plant to a litre,* which quantity is to be taken daily.

2ndly. As long as the patient continues to improve, ptisan and syrup should only be given.

3rdly. When the disease remains stationary, in addition to the ptisan and syrup, the powder may be given, but it must be done with caution.

In this letter Dr. Boileau shows that his *bévilacqua* is distinct from the *Chinchunchulli*, and he states that it is a more active medicine, but he does not yet make known the real name of the *bévilacqua*.

A further letter of the 10th March makes no change in the treatment, but contains the following passage, which is of interest on more than one account:—

"I mentioned in my first letter that twelve lepers were under medical treatment; the number has now increased to fifty-seven. In all these cases, without exception, the progress of the disease has been arrested, as several of my professional brethren of the Mauritius have had an opportunity of observing, and this too has been accomplished after a very short space of time. Up to the present moment the disease has made no progress for the worse, although two or three have nearly given up taking their medicine. Amongst the smaller portion of the lepers on whom the new remedy has been tried, especially those who had been recently attacked with the disease, but little improvement is perceptible on the skin, but its influence on the heart, the pulse, and the brain, has been remarkable. Thus young persons who, under the influence of the disease, had become dull and unfit for anything, who felt as if an enormous weight was attached to their legs, found themselves lighter, and their gait more free, &c. &c. But, in the forty patients more advanced in years, and especially those whose constitutions had been affected by the use of mercury and arsenic, the improvement, both interior and exterior, has been the most remarkable; frightful gangrenous sores have been cicatrised, the spots in the skin are less marked, and the skin itself has become more supple and finer, and has recovered its sensibility. In some instances the disease has totally disappeared from the surface of the body, and is confined solely to the parts exposed to the air; such as the hands, feet, and face. A few of the patients have pustulous eruptions, with pimples similar to those of the small-pox. These are the persons whose exterior improvements are the most marked."

Lastly, in the letter which Dr. Boileau has written under date 1st July, he shows that the *bévilacqua* and *Hydrocotyle Asiatica* are one and the same; he also modifies his last system of treatment:—

1stly. By reducing the dose of *Hydrocotyle* one half for preparing the same quantity of ptisan.

2ndly. Dr. Boileau recommends that the patient shall take baths containing three pounds of *Hydrocotyle* in its green state, or vapour baths prepared with five pounds of the same.

3rdly. The patient should commence with an emetic, and occasionally take doses of aperient medicine during the course of treatment.

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* About an English quart.

4thly. After this preparation the patient should only take the syrup of *hydrocotyle* in doses of from one up to eight spoonfuls.

5thly. The patient should take the *hydrocotyle* in powder as well as in syrup.

With reference to general treatment the practitioner should be guided by the previous letters of Dr. Boileau.

Furthermore, Dr. Boileau declares that the above system of treatment is not definitive, as he thinks that with longer experience it may be modified. He calls upon his professional brethren, and expresses his own belief, that in certain cases *Hydrocotyle* may be combined with success along with other medicines; and especially with preparations of iodine. To which M. Lépine observes, "We know that such combination, which has been tried by other medical men, has produced results which appear to confirm the previsions of Dr. Boileau."

Before Dr. Boileau's discovery of the value of *Hydrocotyle Asiatica* in the cure of leprosy, it, says M. Lépine, already occupied a place in the Indian Materia Medica. The plant has been administered at Pondicherry, and in other parts of India in syrup, as a purifier of the blood in the diseases of children. Horsfield quotes it as a diuretic. Ainslie says that an infusion of its leaves with fenugreek is employed in certain fevers and in diseases of the intestines. M. de Ferusac maintains that it is used as food in certain parts of India, and M Lépine has been himself assured, by several persons, that they have often eaten the leaves of *Hydrocotyle Asiatica* in salad.—*Madras Gazette.*

EXAMINATION OF THE CHICORY SOLD IN FRANCE AS A SUBSTITUTE FOR COFFEE.

BY A. MARQUIS.

The Chicory is prepared for sale by roasting the roots after they have been washed, divided longitudinally, and cut into fragments. This product (*cossettes*) is reduced to powder.

Of seventy-five samples of such chicory, obtained from different shops in Paris, the author found sixty-four which were adulterated with earthy substances.

Pure chicory gives 5 per cent. of ash: the specimens examined gave from 1 to 40, and some even 51 per cent. more than this.

Among the substances used for adulterating chicory the author found :—

1. Roasted bread, which may be detected by the colour which the decoction gives with iodine, or by the odour given off during incineration.

2. Sand, earth.

3. Brickdust. In this case the ash of the chicory has a reddish colour, feels gritty, and contains varying quantities of oxide of iron, silica, alumina, &c.

4. Refuse bone black from sugar refiners. This may be partly separated by stirring the chicory with water, when the bone black settles to the bottom. On burning such a mixture it generally gives off an odour of caramel, and the incineration is much more tardy. The large proportion of phosphate of lime in the ash likewise indicates this kind of adulteration.

5. Sifted coal-ashes may be detected by stirring the chicory with water and allowing the mixture to settle for a minute, when small particles of unburnt coal are first deposited. The ash of such chicory is whitish, contains a large amount of argillaceous substance and carbonate of lime, originating from the limestone usually mixed with the coal dust in the north of France to bring it into the form of bricks.—*Journal de Pharmacie*, September, 1853. No. 210.

DETECTION OF POPPY OR NUT OILS IN OLIVE OIL.

BY E. MARCHAND.

In consequence of the frequent adulteration of olive oil the author had occasion to examine the various methods of detecting it, and has found that the use of sulphuric acid gave satisfactory results.

He describes the process thus: When four drops of olive, poppy, or nut oil are placed separately upon a slab of porcelain, and two drops of pure concentrated sulphuric acid added and mixed with the oils by inclining the slab to one side and the other, the following phenomena are observed:—

Olive Oil acquires at the points of contact with the acid a yellow colour passing into orange; the liquid portion surrounding the magma rapidly becomes dirty grey and then brownish-black, while the yellow colour first produced by the acid gradually passes into bright chestnut-brown. There is never any appearance of blue or lilac tints.

Poppy Oil acquires immediately at the points of contact with the acid a fine lemon yellow colour, which becomes rapidly darker at some parts. The liquid portion in contact with the coloured portions never acquires the dirty grey colour characteristic of olive oil. After the reaction has continued for ten or fifteen minutes, there is observed at several points of the liquid portion which immediately borders upon the coloured part a rose colour, passing rapidly into bright lilac, and gradually increasing in intensity. After half or three-quarters of an hour the lilac colour passes into a violet-blue, while the original yellow gradually becomes dull brown.

Nut Oil behaves almost exactly the same as olive oil, except that the yellow substance is more abundant, more rapidly formed, and becomes brown more rapidly, so that within less than ten minutes it acquires a chestnut colour. Sulphuric acid is far more easily miscible with this oil than with olive or poppy oil. The grey border which is characteristic of olive oil is produced with nut oil as well, but in this case, instead of gradually becoming black, it passes rapidly into olive green. This oil never produces a tint of lilac.

Mixtures of Olive and Poppy Oils may be tested by means of the above reactions. After a certain time, the colours characteristic of poppy oil, pink, lilac, violet, blue, present themselves successively, with an intensity proportionate to the quantity of poppy oil present. Marchand states, that with practice, $\frac{1}{10}$ poppy oil, in olive oil, may be detected with certainty by this method.

Mixtures of Olive and Nut Oils.—When the nut oil amounts to $\frac{1}{4}$ of the whole, sulphuric acid produces a bright orange yellow colour, with a grey border, the outermost parts of which pass into olive green. A mixture of equal parts of both oils gives an orange yellow colour, with a very distinct grey border, which soon becomes greenish and brown at the outer edge. When the mixture contains $\frac{3}{4}$ nut oil, a reddish yellow colour is produced, surrounded by an olive green border, paler than that produced with pure nut oil.

Mixtures of Poppy and Nut Oils acquire, with sulphuric acid, a yellow colour, and at the borders, a greyish tint, gradually diffusing itself over the liquid part. When the mixture contains $\frac{1}{4}$ nut oil, an intense lilac is subsequently produced, while the yellow colour passes into chestnut brown. When the mixture contains $\frac{3}{4}$ nut oil, an orange yellow is produced, with grey borders, passing at certain points into olive green. Subsequently the yellow becomes bright chestnut brown.—*Journal de Pharmacie*, Oct. 1853.

DETERMINATION OF THE PERCENTAGE OF TANNIN IN SUBSTANCES USED FOR TANNING.

BY PROFESSOR FEHLING.

Among the various substances which precipitate tannin from solution, such as gelatin, quinine, animal skin, &c., the latter has hitherto been recommended as the most appropriate for determining the percentage of tannin. This method of valuation has been preferred because it represents in miniature the operation to which the results refer. There are, however, no detailed directions for its application, and in repeated trials made by the author, under a variety of conditions, he has found that the tannin is never perfectly precipitated, and that the solutions soon become mouldy. Experiments with solution of quinine, freshly precipitated oxide of iron or alumina, did not give more satisfactory results. He then tried gelatin in solution, and instead of weighing the precipitate obtained, by adding an excess of gelatin, preferred adopting the volumetrical method, estimating the quantity of solution of gelatin of known centigrade value required to precipitate the tannin. For this purpose it is indispensable that the precipitate should separate readily, but with most kinds of tannin this is not the case. The author has found it advantageous to use a dilute solution of gelatin, and to have the liquids quite cold. His mode of operating is as follows:—

The solution of gelatin is prepared by digesting ten grm. of dry gelatin (con-

taining about eighteen or nineteen per cent. of water) in water for twelve hours, and then applying heat until the solution is complete. The volume is then made up to one litre.

For the purpose of determining the centigrade value of the gelatin solution, 0.2 grm. of pure gallo-tannic acid dried at 212° F. is dissolved in 100 or 120 grm. of water, and the gelatin solution added from a graduated burette until the precipitation is complete. Filtration is generally necessary towards the end of the operation, or as a substitute, the following plan may be adopted: A narrow open glass tube is covered at one end with some tolerably thick linen bound tight by cord; on immersing this covered end into the liquid, and sucking out the air by the mouth at the other end, a portion is rendered clear by passing through the linen, and may be poured into a tube, and tested with gelatin.

The author found that the 0.2 grm. of pure dry tanno-gallic acid required from 32.5 to 33 cub. cent. of the gelatin solution for perfect precipitation; when the gelatin solution is some days old, a larger quantity is necessary, 35, 38, or even 40 cub. cent. It is therefore necessary in all cases, when the gelatin solution has been kept any time, to determine its centigrade value by means of gallo-tannic acid immediately before making any experiments with it.

If it is required to estimate the value of oak or other barks for tanning, they are first dried in a warm room, powdered finely, digested in quantities of 10 grms. with warm water, and exhausted by means of a displacement apparatus constructed of a tube two feet long, one inch wide, and drawn out at the lower end, which is loosely stopped with cotton wool. Some substances may be introduced dry into this apparatus, and exhausted by warm or cold water. The extraction may likewise be facilitated by the pressure of a column of water applied by fitting a narrow glass tube with a cork into the upper end.

In most cases, the extraction is completed in one or two days. When the operation is properly conducted, the quantity of liquid extract amounts to half a pound or a pound. It is then treated with gelatin solution so long as a precipitate is produced. A few drops of dilute hydrochloric acid facilitate the separation of the coagulum.

The quantity to be taken for an experiment of substances rich in tannin, such as galls, is about 0.5 or 1.0 grm. A simple calculation gives the percentage of tannin.

The author states that he has adopted this method in repeated examinations of tanning materials during the last ten years; he has found the results tolerably constant, and notwithstanding its apparent imperfection, more trustworthy than any other yet known.

He estimates the relative value of several substances of this kind, as follows:—

Pine bark	contains from	5 to 7	per cent.	tannin.
Old oak bark	"	9	"	"
Best oak bark	"	19 to 21	"	"
Gall nuts	"	30 to 33	"	"
Aleppo galls	"	60 to 66	"	"
Chinese galls	"	70	"	"

These data at least admit of comparison with each other, and indicate with tolerable certainty the respective value of these substances to the tanner. This method of valuation is indeed based upon the assumption that the same kind of tannin exists in all these substances. It is, however, extremely probable that this is not the case, but at the same time it may fairly be assumed that if different kinds of tannin combine under similar conditions with different quantities of gelatin, they will also combine with animal skins in the same relative proportions. If, therefore, this method does not indicate the absolute percentage of tannin, it still gives the percentage value of the substance examined, and it is precisely this which the tanner requires.

It is another question whether gelatin solution precipitates all the substances of the tanning material which combine with the skin, and it therefore remains to be determined by experience whether such a method of valuation is sufficient for the purposes of the tanner.—*Polytechnisches Central Blatt*, 1853.

CONSTITUTION OF THE "MELT" OBTAINED IN THE MANUFACTURE OF FERROCYANIDE OF POTASSIUM.

Liebig is of opinion that the raw product of melting contains no ferrocyanide, but only cyanide of potassium, while Gmelin, Runge, and others, adopt a contrary view. The results referring to the subject which have hitherto been obtained, are very contradictory, and for this reason Reimann* has, at the suggestion of Professor Fresenius, instituted a number of experiments on the "melts" obtained from several factories, and the behaviour of their various ingredients in the presence of water. These experiments have fully confirmed the opinion that the fresh and still warm "melt" does not contain any ferrocyanide, and that this salt is formed only by the action of water or moist air upon the melt.

Melt from the Buxweiler factory (Bas Rhin).—Apparently produced at a very high temperature; very hard, fracture presenting small crystals of sulphuret of iron.

1. Alcohol dissolved out sulphocyanide and much cyanide of potassium, with a little caustic potash.

2. The residue, after perfect exhaustion with alcohol, was then treated with cold water; the first portions of liquid contained much cyanide of potassium, sulphuret of potassium, and carbonate of potash, sulphuret of copper dissolved in cyanide of potassium, and minute traces of ferrocyanide of potassium. The second portion of liquid contained the same substances, the proportion of ferrocyanide being greater. The residue consisted of carbon, sulphuret of iron, metallic iron, and carburet of iron.

3. A portion of the melt was digested for twenty-four hours with water, air being excluded. The solution obtained contained besides cyanide of potassium a tolerably large quantity of ferrocyanide.

4. A portion of the moistened melt was exposed to a stream of carbonic acid in a closed apparatus, and the evolved gas passed through an acidulated solution of silver. In this way, sulphuret and cyanide of silver were precipitated, which proves that the melt contained cyanide of potassium, for carbonic acid does not disengage hydrocyanic acid from solutions either of sulphocyanide or ferrocyanide of potassium.

5. A portion of the melt was treated with water in a flask at a temperature of about 122° Fahr. A very small evolution of ammonia was observed, and the solution contained a large quantity of ferrocyanide, together with some cyanide of potassium.

6. Another portion was boiled for some time with water in a retort. The evolution of ammonia was considerable, and the solution contained a great quantity of ferrocyanide of potassium.

7. A portion of the melt was digested with water in a small gas generator at 212° F., and the gas evolved passed first through water and then through a tube filled with asbestos, moistened with hydrochloric acid. After the lapse of twenty-four hours the solution yielded hydrocyanic acid when treated with bichromate of potash (to destroy the smell of sulphuretted hydrogen) and sulphuric acid. A faint ammoniacal odour was likewise perceptible at the end of three, four, and even five days, when the presence of cyanide of potassium in the solution could be distinctly recognized.

8. The melt which had been treated in this manner for seven days, was mixed with freshly precipitated sulphuret of iron, and at the end of twenty-four hours the solution no longer contained cyanide of potassium.

9. About twenty grm. of the melt were digested with about three grm. of fused potash and water in the same apparatus, at 212° F., and after twenty-four hours the solution still contained cyanide of potassium, which did not entirely disappear even after the lapse of seven days.

10. The above mass was then mixed with fresh precipitated sulphuret of iron, and within twenty-four hours all the cyanide of potassium was converted into ferrocyanide.

The melts from other factories gave corresponding results.

Cyanide of Potassium (prepared according to Liebig's method), digested with fresh precipitated sulphuret of iron and water, was entirely converted into ferrocyanide within two days.

When digested with fresh sulphuret, caustic potash, and water, the change of the cyanide into ferrocyanide was completed within twenty-four hours.

It appears from the above experiments that it is chiefly the finely divided

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* *Journal für Praktische Chemie*, November, 1853.

amorphous sulphuret of iron which determines the rapid conversion of the cyanide into ferrocyanide, while the crystalline sulphuret (contained in many melts produced at a high temperature) acts much more slowly. Consequently the presence of sulphuret of potassium in the melts is a favourable element in the formation of ferrocyanide of potassium, for then on the addition of sulphate of iron fresh precipitated sulphuret of iron is produced.

A temperature varying from 158° to 176° F. appears to be the most favourable for the extraction of the melt, for at that temperature the formation of ammonia is but small, and the solvent action of the water is considerably augmented.

There is apparently no doubt that the presence of caustic potash facilitates the conversion of cyanide of potassium into ferrocyanide.

PREPARATION OF PARAFFIN AND PURE ACETIC ACID UPON A LARGE SCALE FROM THE DISTILLATION PRODUCTS OF WOOD.

BY REINHOLD V. REICHENBACH.

The author having had occasion to prepare a large quantity of pure paraffin, was desirous of adopting some less tedious process than that by which his father obtained this substance in the first instance. Under these circumstances he was induced to try the action of sulphuric acid at a high temperature, supposing that it would then be more efficacious in destroying the empyreumatic substance mixed with the paraffin. For this purpose he half-filled a large glass retort with fuming sulphuric acid, and added one-third its weight of well pressed raw paraffin. The temperature was gradually raised in a sand bath until distillation began, and after a time he found that the whole of the paraffin had passed over and presented an appearance of perfect whiteness and purity.

From the success of this operation, he applied the method to the preparation of pure acetic acid. The substance employed was the ordinary raw acetate of soda. This salt, containing a large quantity of empyreumatic resin, yielded, when distilled with concentrated sulphuric acid, about half its quantity of very strong acetic acid, which was clear, perfectly colourless, and free from any empyreumatic odour. It was not until the temperature was raised, in order to continue the distillation, that the distillate began to present a brownish-yellow colour, and at the same time a peculiar turbidity. Both these circumstances appeared to be owing to some other cause than the presence of empyreumatic admixtures, and they were found to result from a decomposition of sulphuric acid, by the carbonaceous matter in the retort, and a consequent distillation of sulphur with the acetic acid. The turbid and somewhat coloured acid was rendered perfectly pure by redistillation.

The author then endeavoured to conduct the distillation in such a manner as to prevent this inconvenience. The layer of acetate and sulphuric acid next to the heated wall of the retort would obviously become dry first, and acquire a temperature sufficient to set up a reaction between the sulphuric acid and carbonaceous substance. He therefore interrupted the distillation at this moment, and after well stirring the contents of the retort continued it again. By repeating this two or three times he succeeded in drawing over almost the whole of the acetic acid clear and colourless.

The product thus obtained, of course contained sulphurous acid, and traces of sulphuric acid, carried over mechanically. This objectionable circumstance cannot be altogether avoided, even when pure acetate is used; but both substances may be easily separated by the addition of a little peroxide of manganese or lead together with a simple redistillation.

The form of apparatus afterwards employed by the author was a basin-shaped vessel of cast-iron, with a broad flat rim, upon which fitted a flat lid, with a copper dome in the centre, capable of being cooled by a stream of water. The iron lid may be removed at intervals, when the distillation is interrupted for the purpose of stirring the contents with shovels. He has thus been able to prepare about a hundred-weight of pure concentrated acetic acid daily. — *Jahrbuch der K. K. geologischen Reichsanstalt, Jahrg.* iii., No. 2.

NEW PROCESS FOR ASCERTAINING THE PRESENCE OF IODINE AND DETERMINING ITS QUANTITY.

BY M. DE LUCA.

The following process for the determination of iodine was suggested to the author by M. Balard, and employed by him in the examination of two samples of bromine which were supposed to contain iodine. The process is very simple; its sensibility is almost unlimited; it will succeed even in the most inexperienced hands, and the presence of chlorine and bromine does not affect the result.

The liquid, supposed to contain iodine in the form of an iodide, is introduced into a tube closed at one end, a few drops of sulphuret of carbon or chloroform added, and then a very dilute aqueous solution of bromine. The bromine decomposes only the iodides; neither the chlorides nor bromides. By shaking the mixture the free iodine is dissolved in the sulphuret of carbon, to which it gives a violet colour of greater or less intensity, or a rose colour when the quantity is very minute.

In this manner the iodine contained in the hundredth part of a milligrm. of iodide of potassium may readily be detected, and perhaps even smaller quantities.

An excess of bromine must be avoided, as this would form with the iodine a compound which does not give the violet tinge to the sulphuret of carbon; and, moreover, an excess of bromine gives a yellow colour to the sulphuret of carbon.

When the solution of iodide is alkaline, it must be neutralised with weak nitric acid before submitting it to the treatment just described.

This process may also be applied to the estimation of iodine. For this purpose a normal solution of bromine is prepared, containing 1 grm. of bromine in 4 litres of distilled water; 4 cub. centims. of this solution will then contain 1 milligrm. of bromine. To 40 cub. centims. of this solution, containing 10 milligrms. of bromine, sufficient water is added to make the volume up to 1 litre. Each cubic centimetre of this new solution will contain $\frac{1}{100}$dth milligrm. of bromine.

Two slender graduated pipettes are required for the operation—one for the solution of bromine, the other for the sulphuret of carbon; for it is necessary always to employ the same quantity of sulphuret of carbon, in order to appreciate the shade of colour in the same quantity of liquid. The sulphuret of carbon coloured by the iodine is removed, and replaced by a fresh quantity. This is repeated until the sulphuret no longer acquires any colour.

This mode of determination may be compared to that of silver by means of chloride of sodium, in which the addition of test solution is stopped as soon as there is no longer any precipitate formed. In the present case the addition of sulphuret of carbon is stopped when it ceases to acquire colour.

The quantity of bromine employed, minus that which produced no colour in the sulphuret of carbon, indicates by a simple calculation the quantity of iodine liberated from the substance under analysis. The normal solution of bromine should be added by drops, and the number of drops contained in a cubic centimetre must be previously ascertained.

By this process the quantities of chlorine, bromine, and iodine, contained in a given mixture, may be determined simultaneously in the following manner:—By means of solution of silver of known strength, the quantity of silver required to precipitate the three metalloids is ascertained; then, by means of bromine, the quantity of iodine is determined; lastly, by means of chlorine, the bromine and iodine are determined together, and the necessary elements of calculation are obtained.

The solution of chlorine employed in the determination of the bromine and iodine is prepared as follows:—A solution of chlorine in distilled water is first made, and then diluted with water to a certain volume. The value of the solution thus prepared is determined by means of a solution of iodide of potassium of known strength, treated as above with sulphuret of carbon. The quantity of chlorine employed to expel all the iodine from the iodide of potassium indicates the value of the solution. The solution of chlorine should be recently prepared, and kept in a blue bottle with a ground-glass stopper. When it has been prepared some days, it is advisable to ascertain its strength before making use of it.—*Comptes Rendus*, December 5th, 1853, p. 866.

IODINE IN CHEMICAL REAGENTS

Barreswill* remarks that all, or very many of the reagents employed for the detection of iodine, frequently contain iodine themselves.

Nitric Acid very generally contains iodine. It may be detected by diluting the acid with an equal volume of water and passing the vapour, generated in a flask with a delivery tube, into very clear solution of starch.

Nitrates of Potash and Soda usually contain iodine. For its detection the salt is treated with pure nitric acid and the above test applied. The same plan may be adopted for the preparation of pure nitric acid from either salt ; five parts of nitric acid are sufficient for 100 parts of nitrate of soda.

Sulphuric Acid usually contains iodine, originating from the nitrates employed in its manufacture. It may be detected as above.

Hydrochloric Acid contains iodine.

For the purpose of obtaining potash free from iodine, Barreswill proposes to purify nitrate of potash by repeated crystallization, convert it into sulphate, and then to separate the sulphuric acid by means of pure baryta.

Iodine may be detected in bromine by pouring it into a large excess of solution of protosulphate of iron, adding pure nitric acid until the liquid acquires a dark brown colour, and testing the vapour as above.

The author states, in conclusion, that he intends to follow up this notice by a memoir, in which he will show that many statements as to the presence of iodine in various substances are erroneous.

MEANS OF RENDERING IODINE SOLUBLE IN WATER.

Debauqne† has observed, that iodine is soluble in water to which syrup of orange is added, and still more so in water containing tannin. Two grains of tannin are sufficient to effect the solution of ten grains of iodine in six ounces of water.

A BED OF AMBER.

Prague, *Jan.* 13.—In digging for a well in the coal mines near this city the workmen met, between the bed of gritstone which forms the roof of that mine and the first layer of coals, a bed of yellow amber, apparently of great extent. Pieces weighing from 2lb. to 3lb. have been extracted.—*Times*, Jan. 25th.

SIMPLE MEANS OF PREVENTING THE FORMATION OF INCRUSTATIONS IN BOILERS.

BY R. FRESENIUS.

It has been found, since 1851, that no incrustation was formed in the boiler of a steam-engine at Ems, whilst the water with which the boiler was supplied contained 21.898 grs. in the pound of solid matters. These were—

Carbonate of soda	11.35488
Sulphate of soda	0.10790
Chloride of sodium	7.27020
Sulphate of potash	0.43653
Carbonate of lime	1.24370
Carbonate of baryta	1.06890
Carbonate of iron	0.01728
Carbonate of manganese	0.00868
Carbonate of baryta and strontian	0.00215
Phosphate of alumina	0.01090
Silica	0.37839
	21.89951

From this Fresenius concludes that it is not carbonate of lime, but only sulphate of

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* *Journal de Pharmacie et de Chimie*, 3 Sér., xxiv.. 346.

† *Notizen aus dem Gebiete der practischen Pharmacie.* January, 1853.

lime which causes the formation of crust, and that in the present case this is prevented by the quantity of soda contained in the water. This has given occasion to investigations, in which soda was added to water containing sulphate of lime, which hitherto had always deposited incrustations. In these cases the action was always found successful, so that Fresenius regards the addition of soda as the simplest means for the prevention of incrustation.

The author gives the following rule to prevent the addition of soda in excess:—100 parts of anhydrous sulphate of lime are decomposed by 78 parts of pure calcined soda. The discovery of the correct quantity is so simple and easy, that this circumstance does not present the least difficulty. Care must be taken that there be always a slight excess of soda present, and the water in the boiler must therefore be tested from time to time. This is better and more accurately effected than with test-paper, by dividing a sample (filtered if necessary) of the water of the boiler into two parts, and adding to one part solution of soda, to the other lime-water. If the former remains clear whilst the other is rendered slightly turbid, the proportion is correct. If the reverse is the case, soda must be added, whilst its quantity can be diminished if the turbidity with lime-water be very great.—*Journ. für Prakt. Chem.*, lviii. p. 65.

THE PATENT SULPHATE OF QUININE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In consequence of the statement made by me in the *Pharmaceutical Journal* in November last, that the white sulphate of quinine of the late British and Foreign Alkaloid Company contained twenty per cent. of sulphate of quinidine, whilst that of Messrs. Howard and Kent contained scarcely five per cent., Mr. Edward Herring has sent me a sample of his newly-patented sulphate, and also referred me to Messrs. Giles and Son, of Clifton, to procure a sample for analysis, and the result is, that their white patent article contains, as nearly as possible, the same quantity of sulphate of quinidine as that of Messrs. Howard and Kent, namely, 4.907 per cent.

I think this information may be acceptable to your readers, and it is certainly only an act of fairness towards the manufacturer that such a result should be generally known, for as the British and Foreign Alkaloid Company have discontinued the manufacture of this article, and the premises occupied by them have passed into the hands of Mr. Herring, the discredit of their processes and impure product may be undeservedly attached to his article of manufacture.

This patent quinine appears to occupy a much larger bulk than the usual article of commerce—even that manufactured by Messrs. Howard and Kent. It is probable that this depends upon the method adopted in the crystallization of the two salts, that made by Mr. Herring being more silky and finer, or more slender in the crystal than that of the standard article of commerce, which appears of equal purity as far as the per centage of the other cinchona alkaloids is concerned.

I have had no opportunity of comparing their water of crystallization yet.

There is no inorganic impurity, and it is altogether a very good, pure specimen, and in the manufacture of the large optical plates of Herapathite it is equally serviceable, and in the hands of two experimenters has furnished equally good crystals for the polariscope.

I remain, Sir, yours very obediently,

W. Bird Herapath, M.D.

32, *Old Market Street, Bristol, Jan.* 31*st*, 1854.

QUEVENNE'S IRON.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Analytical Laboratory, Surgeons' Hall, Nicolson Street, Edinburgh, Feb. 18*th*, 1854.

Sir,—In your number for January last, Mr. Morson, in a paper entitled "*On the Substitution of the Magnetic Oxide of Iron for Iron in the Metallic state reduced by Hydrogen*," makes a complaint against me, and I ask the favour of sufficient space in your present number to reply to the charge.

The complaint in question represents me as having done a double wrong. I have, in the first place, given Mr. Robertson an analysis, which, as it is at variance with the results of other Chemists, must be inaccurate; and in the second, I have not pointed out that Mr. Heathfield's "Quevenne's iron" was magnetic oxide of iron. I shall discuss these complaints in turn; and first of the analysis, which I reprint here in full, as in Mr. Morson's paper two of the figures referring to Mr. Heathfield's specimen are given wrong, and the numbers make up only 97.01 instead of 100. I do not doubt that this mistake has been made inadvertently, but it has unavoidably misled readers of the paper, for the percentage of iron in Heathfield's preparation is represented as 75.55 instead of 78.55, and my statement that it contained seven per cent. more of the metal than Morson's preparation, is necessarily unintelligible. The percentage of water is also made 1.43 instead of 1.42.

"*Analysis of two samples of Quevenne's Iron received from J. Robertson, Esq., Druggist, George Street, Edinburgh.*

	No. 1, Morson's.	No. 2, Heathfield's.
Metallic iron	71.35	78.55
Sulphur (as sulphuret of iron)	0.51	0.41
Water	2.01	1.42
Insoluble in acids	2.52	1.24
Oxygen and loss in analysis	23.61	18.38
	100.00	100.00"

I have no alteration to make in the analysis printed above, which I feel assured is quite accurate. Had I anticipated the controversy which has arisen, I should have preserved a portion of the specimen of Morson's preparation, so that the analysis might be repeated, but not looking forward to any such discussion, I did not keep that specimen apart. However, it was not thrown away. I received from Mr. Robertson originally a small sample of Morson's "Quevenne's iron," with which some preliminary trials were made, and afterwards a larger one, which was employed for the analysis given above.

When the report was furnished to Mr. Robertson, the samples were put together into the same tube, as substantially identical, with a view to their preservation as a specimen for exhibition to my class. This mixed sample I have taken as the nearest approximation which can now be obtained to the original specimen, and have subjected it to analysis. In making this analysis, as well as the published one, and those referred to in the sequel, my assistant Dr. S. Macadam and I have worked together, with a view to guard more certainly against mistake.

This analysis was made as the first had been, by digesting the powder in aqua regia, filtering from insoluble matter, and precipitating by ammonia. The precipitate was carefully washed and dried, and after the filter had been incinerated, the oxide of iron was moistened with nitric acid and raised to a low red heat. The quantity of peroxide of iron thus procured corresponded to 75.03 per cent. of metallic iron, or the mixed specimen contained nearly four per cent. more of iron than the original sample which formed a part of it—$3\frac{1}{2}$ per cent. less than Heathfield's preparation—and 25 per cent. less than pure *Pulvis Ferri* should yield.

As for the second complaint, namely, that I did not call Mr. Heathfield's preparation "Magnetic Oxide of Iron," I might reply that, had I done so, I must, and with greater emphasis, have applied that name to Mr. Morson's preparation. I applied it to neither, because, in the first place, the question referred to me by Mr. Robertson was, "Which of these preparations is the purer Pulvis Ferri?" and, secondly, I did not, and do not regard either as having been the definite magnetic oxide of iron, $Fe_3 O_4$. This will sufficiently appear if the amount of metal and oxygen be compared. The proportion of oxygen in Heathfield's preparation, namely, 18.38 per cent., would unite to form magnetic oxide ($Fe_3 O_4$) with 48.24 of iron, leaving 30.31 of metal over. The proportion of oxygen in Morson's preparation, namely, 23.61, would unite to form the same oxide with 61.97 of iron, leaving 9.38 of metal over.

As for the exact condition in which the metal was in these specimens, I did not, and do not now offer any opinion, further than that I believe a portion to have been free, and a portion oxidized. Red oxide of iron partially reduced by hydrogen

(which was the chief component of both preparations) will contain iron in the metallic form, and also complex combinations of all its known oxides. A mere calculation from the percentage of oxygen will not determine the condition of the metal, neither will the action of such reagents as potass and ammonia on the dissolved compound. Only a protracted and difficult analysis will supply the requisite information, and even then the result will be in part conjectural. I neither offered, nor was asked to make such an analysis, which was quite uncalled for; but in the report on Messrs. Morson and Heathfield's preparations, I applied impartially the same standard, and that a fair one, to the determination of their respective claims, to be called metallic iron.

I have only to add, that whilst Mr. Robertson, who has long been known to me as a very conscientious and scrupulously careful Pharmaceutical Chemist, had my full permission to make known to others my analysis and report, had I foreseen that I should be involved in the controvery which has arisen, I should have requested from Messrs. Morson and Heathfield several samples of their "Quevenne's Iron" before allowing myself to be referred to publicly as an arbiter between them.

It may contribute to put an end to a dispute, which the exercise of a little charity might have prevented ever arising, if I state that I have no doubt, from the quality of the sample of Quevenne's iron analyzed by Dr. Gregory, that Mr. Morson can prepare *Pulvis Ferri*, making as near an approach as is needed to perfect purity; and that Mr. Heathfield can prepare it equally pure, I have ascertained for myself by the analysis of two specimens sent me by Mr. Robertson, the one of which contained 91.51, the other 98.59 per cent. of metallic iron.

I remain, yours truly,
GEORGE WILSON, M.D.

REGISTER FUND PRIZE, SCOTLAND.*

CONDITIONS

To be complied with in competing for the Register Fund Prize to be given by the North British Branch of the Pharmaceutical Society.

1st. The subject fixed upon by the Council in Edinburgh for competition is, "On the General Properties and Characters of the Vegetable Alkalis."

2nd. That competitors shall include Associates and Apprentices of the Pharmaceutical Society resident in Scotland.

3rd. That all Essays shall be delivered to the Secretary at 121, George Street, on or before 1st April, 1854.

4th. Each paper to have a motto and be accompanied with a sealed envelope containing the name of the author, and leaving the corresponding motto attached.

5th. That the Prize Essay be read at the last Scientific Meeting of the present Session, when the Prize will be awarded, and that the paper shall be considered the property of the Society.

JOHN MACKAY, *Secretary.*

REVIEW.

THE COMMERCIAL PRODUCTS OF THE VEGETABLE KINGDOM, *considered in their various uses to Man and in their relation to the Arts and Manufactures; forming a practical Treatise and Handbook of Reference for the Colonist, Manufacturer, Merchant, and Consumer, on the Cultivation, Preparation for Shipment, and Commercial Value, &c., of the various substances obtained from Trees and Plants, entering into the Husbandry of Tropical and Sub-Tropical Regions, &c.* By P. L. SIMMONDS, Honorary and Corresponding Member of the Royal Agricultural and Commercial Societies of Jamaica, British Guiana, Antigua, Barbadoes, Konigsberg, &c. &c. London: T. F. A. Day, Carey Street. 1854. 8vo. Pp. 668.

THIS work, which the author commences by assuring us "will be found the most full and complete book of the kind that has ever yet appeared," purports to be a

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* This communication was received after the first sheet, containing the Transactions of the Society, was at press.—ED.

practical treatise on "the cultivation and manufacture of the chief agricultural productions of the Tropics and Foreign Countries." As such, the more considerable portion of it is devoted to information respecting tea, coffee, sugar, the cereal grains, tobacco, and other important articles of commerce derived from the vegetable kingdom, while the remainder comprises notices of substances of minor consequence, including not a few constituents of the Materia Medica. Upon the last named it is our province to offer a few remarks.

Had such writers as Pereira, Christison, Royle, Guibourt, Thomson, and Duncan never existed, or had their works been completely inaccessible, we might have pardoned the gross inaccuracy that distinguishes many of the statements we here find regarding the commonest drugs.

What can we say to such assertions as that the Quassia "sold in the shops is the tough, fibrous, bitter *bark of the root* of *Simaruba excelsa*;" or that Jalap is brought to this country in thin transverse slices; or that Gamboge is a production of South America!

With errors like these, we can hardly be surprised at hearing that Cascarilla bark is obtained chiefly from *Croton Cascarilla*, which Dr. Lindley has proved does not afford it; or that Jalap is the produce of *Convolvulus Jalapa*, which Pereira says is well known to yield none.

The article *On Cardamoms*, at pp. 419, 420-1, is perfectly loaded with errors, and many other instances might easily be adduced of the lamentably careless manner in which Materia Medica has been handled in the work before us.

With the existence of so many excellent books on Materia Medica, from which it would have been no difficult task to have compiled, it is deplorable to have to notice the propagation of such crudities. Wrong statements in science are worse than useless, and Mr. Simmonds' pharmacology forms no exception to the rule.

BOOKS RECEIVED.

A Treatise on Dentistry *and the Care and Preservation of the Teeth; containing general Remarks on the Teeth, their Irregularities, Diseases, Remedies, and Extraction, and on Artificial Teeth.* By Samuel Fowell. London: Simpkin, Marshall, and Co. 8vo, pp. 80.

Veterinary Medicines; *their Actions and Uses.* By Finley Dun, V.S., Lecturer on Materia Medica and Dietetics at the Edinburgh Veterinary College, &c., &c. Edinburgh: Sutherland and Knox, George Street. London: Simpkin, Marshall, and Co. 1854. 8vo, pp. 412.

The London University Calendar, 1854. London: Taylor and Francis, Red Lion Court, Fleet Street.

Hand-Book of Chemistry. By Leopold Gmelin. Vol. VIII. *Organic Chemistry*, vol. II. Translated by Henry Watts, B.A., F.C.S. London: Printed for the Cavendish Society. 1853.

The Monthly Journal of Industrial Progress. Edited by William K. Sullivan, Chemist to the Museum of Irish Industry. Nos. I. and II. Dublin: W. B. Kelly, 8, Grafton Street. London: Simpkin and Marshall. Edinburgh: Oliver and Boyd. Cork: J. O'Brien, Patrick Street; and all Booksellers.

The Dublin Hospital Gazette. No. I. Dublin: W. B. Kelly, 8, Grafton Street.

Proceedings of the American Pharmaceutical Association *at the Annual Meeting, held in Boston, August* 24, 25, *and* 26, 1853. Published by direction of the Association. Philadelphia: Merrihew and Thompson. (12 Copies.) 1853.

The Laws of Epidemic and Contagious Diseases; *and the Importance of Preventive Medicine.* An Introductory Address to the Epidemiological Society, delivered Nov. 7, 1853. By James Bird, M.D., F.R.C.S., &c. Published at the Society's request. London: John Churchill, Princes Street, Soho. 1854.

TO CORRESPONDENTS.

THE PORTRAIT OF THE LATE DR. PEREIRA.—We are requested by the London Hospital Committee to announce the completion of the engraved portrait of Dr. Pereira, which is ready for delivery. Subscribers to the bust, which is to be placed in the School of the London Hospital, who are entitled to an impression of the portrait, are requested to apply to either of the Treasurers, Dr. Letheby or Mr. Redwood, or to give instructions for the portrait to be forwarded.

QUEVENNE'S IRON.—Mr. Heathfield, in reference to an editorial note on this subject in our last number, disclaims having stated or inferred that fraud or adulteration had been practised by another manufacturer, and observes that it was not until his preparation had been stated to be magnetic oxide of iron, that he felt called upon to defend himself from the charge.

G. F. (Glo'ster).—(1.) Solution of chlorinated lime (about one pound to three or four gallons) is sometimes used for bleaching linen. (2.) Plants suitable for the examination table may be found in any garden or hedge-row, but the most appropriate are grown in medical gardens. The Phytological Club might be of service to our Correspondent. (3.) Sulphate of magnesia is more soluble in hot than cold water.

F. E. M. (Stamford).—Gutta percha may be cemented by the application of heat, or by a solution which is sold for that purpose.

J. R. S. (Sheffield).—*Tannic acid* and *tannin* are identical.

J. A. (Edinburgh).—*Tinctura sabinæ:* ℞. Savine one part, alcohol four parts; macerate for ten days and filter. Dose, ten to fifteen drops.—*Soubeiran.*

N.B. This should never be taken except under medical advice.

F. M. (London) wishes to know how to prepare the following, so as to form an uniform mixture that will not separate:

℞. Liquor ammoniæ
Olei amygdalæ ā ā ʒij.
Olei macis ʒss.
Sp. rosmarini ℥j.
Aquæ rosæ ℥iiss. ℿ

A Subscriber (Loughboro').—(1.) Vol. xii., p. 314; and vol. xiii., p. 149. (2.) Mahogany stain on wood: boil ½lb. madder and 2 ozs. of logwood in a gallon of water, and brush the wood well over with the hot liquid. When dry, go over the whole with a solution of two drachms of pearlash in a quart of water. (3). *Chemical chests* for elementary experiments, from 16*s.* to £3 3*s.*

A Member (Devonport).—*Hungary Water.* Spirit of rosemary 4 pints, orange flower water ¼ pint, essence of neroli 4 drops.

A. B. (Sandgate).—Uric acid from serpents may be obtained of Mr. Button, Holborn Bars, or other dealers in chemicals; also from menageries.

I. M. (Taunton).—We are not experienced in the mode of preparing wax for making wax flowers.

A Registered Apprentice (Bury St. Edmund's).—(1.) Yes. (2.) Candidates who pass the examination creditably receive the certificate referred to.

THE INDEX TO THE FIRST TWELVE VOLUMES.—Those who may desire to subscribe to the Index are referred to the Advertisement on the Cover, and requested to sign the slip and forward the same to Mr. Churchill.

J. F. (Castle Donington).—Mr. Redwood is the Secretary of the Cavendish Society.

Mr. Jennings's communication was received too late for this month.

Photographer.—A paper on the preparation of collodion will be found in the number of this Journal for August last, page 68.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. CHURCHILL, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. X.—APRIL 1st, 1854.

THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY —CORRESPONDENCE ON THE SUBJECT.

Some observations in our last number have called forth a letter from Messrs. Prichard and Collette, which is subjoined. A copy of the same was forwarded to the President, with one addressed to himself, both of which he laid before the Library and Museum Committee, at a Meeting held on the 16th of March.

LETTER TO THE PRESIDENT.

15*th March*, 1854.

Sir,—Understanding that the Council of the Pharmaceutical Society are responsible for the articles contained in the *Pharmaceutical Journal*,* we beg to enclose you a copy of a letter we have sent to the Editor of that journal, and we trust that that communication may be made known to the Members of the Society in the same public manner as the statements Mr. Dickinson has had to complain of.

We are, Sir, your obedient servants,

Mr. Henry Deane,
Clapham Common.

Prichard and Collette,
57, *Lincoln's Inn Fields.*

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

March 15*th*, 1854.

Sir,—Our attention has been called to an article in the *Pharmaceutical Journal* of the 1st inst. on the proceedings against the Pharmaceutical Society, some reply to which seems to be due to our client, which may not, we are induced to hope, be without use to all interested in the question in dispute.

To the somewhat elaborate apology for the rejection of our proposal to try the point at issue between Mr. Dickinson and the Council by a special case for the opinion of the Court, being chiefly of an argumentative character, it is scarcely within our province to offer any reply, and we forbear to do so, as we have seldom found that the advantage in an argument on either side conduces to that state of feeling in which those engaged in the controversy are most likely to form just and safe conclusions. But in justice to our client we beg to offer the following statement of facts, in the hope that their publication will remove, some part at least, of the misconception of his motives and proceedings.

It was by our client's request that we, a second time, made the proposal to try the question at issue by a special case in which all parties, including those whose position is in question could be heard, and have the opportunity of stating in the least expensive form all the facts on which they relied, an opportunity not directly afforded under the mandamus. We were even instructed by Mr. Dickinson to make such a proposal as we believe might have led to the removal of all obstacles to a settlement of this case, honourable to both parties; but our advances were met in such a manner as left it impossible for Mr. Dickinson to make any further advances for the purpose of bringing about an amicable arrangement, and he had therefore no alternative but to proceed with the mandamus.

In the proceedings of the Society a direct infringement had been committed, as Mr. Dickinson had been advised, of a fundamental requisition of the Act of Parliament by which the Society is established, in consequence of which a large number of

* The Editor is responsible for all articles in the Journal, except the portion included in the Transactions of the Society.—Ed.

innocent persons have been rendered liable to legal proceedings for every day that they continue to practise as Pharmaceutical Chemists. So far as the proceedings have gone, the result has been to show that Mr. Dickinson has been correctly advised. As one of the Council and a Member of the Society, though in the minority, he has a right, which the *Pharmaceutical Journal* does not deny, and he feels it a duty to see that the proceedings of the Society, to which he must be taken to be a party, are legal, and not such as to place a large number of gentlemen in a false position.

In performance of this duty Mr. Dickinson disclaims any desire to inflict on the Society the evils of protracted litigation, or to seek its destruction, as charged against him in the rumour to which you refer in the article in question; on the contrary, he believes he best consults its interest in seeking to have its proceedings brought to a state of conformity with the Act, and that some plan should be adopted for securing those who now hold under its authority, at most but a doubtful position, in their profession and before the public.

On these grounds alone, it is not fair towards Mr. Dickinson to represent him as a wanton disturber of the peace of the Society "whom nothing but the pound of flesh" will satisfy, and upon whom all efforts to conciliate have no effect.

Will those who differ from Mr. Dickinson, if unwilling to concede their opinions to his, which he has no right to expect, now allow the point in difference to be settled in the least expensive manner, and with the least delay? If, when the question has been decided, it should be found that he has been right, he will then—or if, on the ground of saving the expense of a special case for the barren object of merely trying who is right, it can be dispensed with—he is ready at once, setting aside all personal considerations, to join with the rest of the Council in devising and carrying out some middle course; by which, if a wrong step has been taken, proper provision may be made against its future consequences.

Should this proposal be entertained, we trust that it may be received without its being thought that its adoption would imply concessions unpleasant to the feelings of any one; and we may perhaps be allowed to urge, that before coming to a conclusion it may be borne in mind, that were Mr. Dickinson now to retire from the contest, and even to go so far as to admit he had been altogether wrong, it would by no means settle the question; which, being a point of law, would always remain open for any person who might hereafter find it a convenient weapon to use either against the Society or any of its Members.

We are, Sir, your obedient servants,

PRICHARD AND COLLETTE,

57, *Lincoln's Inn Fields.*

As Messrs. Prichard and Collette have made a direct and public allusion to a communication which passed between them and the solicitors of the Society, it is necessary to place before the Members facts connected with that communication. It is presumed that the advances of which Messrs. Prichard and Collette make mention in their letter printed above, have reference to a personal interview between Mr. Collette and Mr. Brace, and to subsequent correspondence. At the interview in question, Mr. Collette repeated his arguments in favour of a special case, and Mr. Brace explained the grounds upon which he could not advise his clients to concur in such a proceeding, protesting against the course adopted by Mr. Dickinson, as tending to no good result, but involving much expense and obloquy to himself, as well as serious injury to the Society. Mr. Brace further intimated that as the Council were the parties assailed, they were not in a position to make any proposal, but that their solicitors were quite ready to entertain any proposition from the other side, to which, if at all reasonable, their clients would doubtless accede. A hope was expressed that Mr. Dickinson would see the propriety of discontinuing his course of hostility, and the solicitors of the Society certainly entertained an expectation of receiving a communication with that object. Instead of this, however, the following letter was soon afterwards received :—

6th February, 1854.

DEAR SIRS,—Will you please to furnish us with a copy of the short-hand writer's notes, at fourpence per folio? If not, will you please to let us know who reported the proceedings. We are, dear Sirs, yours truly,

PRICHARD AND COLLETTE,
57, *Lincoln's Inn Fields.*

Messrs. BRACE and COLT.

Subjoined is the reply.

Surrey Street, Strand, 7th February, 1854.

GENTLEMEN,—We have received with some surprise your note of the 6th instant, as we have already intimated that your client's proceedings, being of a most hostile character against the Council and Registrar of the Pharmaceutical Society, and such as cannot, in our belief, tend to any practical good, we must decline to render you any assistance whatever in the prosecution of your client's attempts.

In our last communication we expressed a hope that the present expensive litigation would be abandoned; and it would have been gratifying to us if we could have been instrumental in bringing about a better state of feeling. Failing in this respect, we have only to meet any renewed attack which your client may think it expedient to make.

We remain, Gentlemen, your very obedient servants,

Messrs. PRICHARD and COLLETTE,
57, *Lincoln's Inn Fields.*

BRACE AND COLT.

The above letters are published by desire of the Committee which met on the 16th: the President having on that occasion stated the substance of a verbal communication which had been made to him by Mr. Dickinson to the effect that he had intended to make a proposition to the Council which would have superseded the necessity of further litigation, but that the impertinent and uncivil reply of Messrs. Brace and Colt to a courteous letter from his solicitors, had put a stop to the negotiation, and left him no alternative but to proceed with the mandamus. This being in substance repeated or implied in Messrs. Prichard and Collette's letter of March 15th, the Committee thought it desirable that the letter itself should be published with a brief statement of the facts of the case.

We are also authorised to correct an impression which generally prevails, namely, that the Members elected under the Bye-laws of November, 1852, are represented by Mr. Dickinson as being unqualified and incompetent persons. Mr. Dickinson disclaims any such aspersion. He does not dispute or call in question the qualification of these parties, and is indignant at a clause in the affidavit of the President, to the effect that the said parties "are not, as represented by Mr. Dickinson, ignorant and incompetent persons, but certified to be duly qualified," &c. His solicitors describe them (the new Members) as "*innocent persons*, rendered *liable to legal proceedings* for every day that they continue to *practise as Pharmaceutical Chemists.*"

The Council are invited to join the opponent of the Society "in devising and carrying out some middle course." This is impossible. The aim and object of the attack is to procure the expulsion of nearly a third of the Members, or to deprive them of the privilege of registration as Pharmaceutical Chemists, which would frustrate the operation of the Act. All the Members of the Society, are, *de facto*, Pharmaceutical Chemists, the Act having reference to no other persons. It is the duty of the Registrar to keep and maintain complete registers of such persons. The question at issue is a legal technicality. This, if decided against the Society, would involve the necessity for an Act of Parliament to amend and explain the present one, which, in the absence of this dispute, would answer all the purposes for which it was passed. It is the imperative duty of the Council to defend the rights of the Members and the interests of the Society by every legal means, and to persevere in this defence (if it should be necessary) by appeal to another Court. We do not anticipate that such extreme measures will be required, but considering the proverbial uncertainty of the law in general, and the intricacy of some points connected with the present case, it is proper to be prepared for any event that may arise.

THE COUNCIL MEDAL OF THE PHARMACEUTICAL SOCIETY.

The dies being completed, this medal will in future be awarded at the annual distribution of prizes, under such regulations as may from time to time be adopted by the Council. One side of the medal contains the shield and supporters of the Society, similar to those on the Certificate of Membership, with the motto "*Habenda ratio Valetudinis*" in the centre. On the reverse is a wreath, within which are the words "Pharmaceutical Society of Great Britain. Incorporated A.D. 1843. Charter confirmed 15th and 16th Vict., cap. 56, 1852." The names of those to whom the medal is awarded, with the date and the subject of the competition, will be engraved on the edge of the medal.

It was formerly proposed to adopt the great seal of the Society, which was executed by the late Mr. Wyon, R.A., so as to be used as a die for the medal; and the "Seal Committee" appointed in 1843, made a suggestion to this effect, with an estimate of the cost of the medals in silver and bronze, in a report presented to the Council in February, 1844. It was, however, considered premature at that time for the Society to issue a medal, and the question was therefore deferred. Some time afterwards it was revived on account of the difficulty of making a satisfactory selection of books for distribution as prizes, but in anticipation of the passing of the Pharmacy Bill, it was again postponed, in order that the confirmation of the Charter by Act of Parliament might be recorded on the medal.

After the passing of the Act the Council resolved to carry out the original intention of establishing a medal, but on further consideration it was decided not to use the great seal as a die, but to have a separate die engraved, omitting the arms of the Society, and substituting the motto on the shield. The work has been executed by Mr. Leonard Wyon, son of the late Mr. Wyon, R.A.

The medal is called the Council Medal, by way of distinction from the Pereira Medal, which is now in process of execution by the same artist.

LATE EXCISE PROSECUTION—SALE OF SPIRIT OF WINE.

A copy of a letter addressed to the Editor of the *Birmingham Journal*, and containing the particulars of a recent prosecution by the Commissioners of Inland Revenue, has been circulated among the trade by the defendants, Messrs. Lowe and Hornby, of Wolverhampton. This is accompanied with a circular, suggesting the propriety of petitioning Parliament for an alteration of the law with regard to the sale of spirit of wine.

The circumstances of the case are thus stated:—

"A retail Chemist and Druggist (Edward Greensill, of Stourport) sent to us an order for a number of medicines and chemicals, among which was a gallon of spirit of wine; he afterwards sent another order (*ostensibly for his brother, a Surgeon*) for several medicinal articles, including half a gallon of the same commodity. Both orders were executed in perfect good faith, as we knew not then the character of the man with whom we were dealing, but we were aware that he could not obtain the article at home of sufficient purity for medical purposes, for under no circumstances have we ever accommodated our customers with spirit of wine *except for medical purposes* and in *country districts*, where it is well known that the pure spirit was not otherwise obtainable. We had no suspicion, of course, that this was a deliberate scheme to gratify a personal spite, which had been nursed for some months, on account, it would seem, of one of our firm having pressed Greensill for the payment of an overdue account. It was so, however; the invoices were handed to the Board of Excise, and this prosecution was the result."

The report proceeds to state that a conviction took place, and the penalty was mitigated to £25, with £5 costs. A peremptory order for payment was issued, although fourteen days had been allowed by the Court. The spirit of wine was sold under the name of *tinctura hordei*, and labelled accordingly, which the defendants consider should have shielded them from prosecution, as it might be inferred, from the use of the Latin label, that it was not intended for any but those who had been medically educated. The Board, however, considered this an aggravation of the offence, as showing an animus of fraud. Moreover, the defendant refused to take payment after the proceedings had been threatened, which was held to be a further aggravation, being an attempt to evade the penalty by a mere technicality.

Messrs. Lowe and Hornby quote the following passage from a report of an interview with the Chairman of the Board of Excise:—On the 21st Dec., 1844, "Mr. Wood stated, with regard to the informations recently laid, it had been the desire of the Board to exercise the power it possessed with discretion and a due allowance for the circumstances of each particular case; that, of the very numerous informations which had been laid, (and all of which had come under his personal cognizance) a very small proportion had been acted upon; and *in every case in which it could be shown that the vendor believed it to be required for any medicinal purpose, the information had been quashed.* Although, therefore, the Excise possessed the power of enforcing the penalty in every case, the Board exercised such discretion in the matter as the Chairman contended ought to be considered a sufficient protection for Chemists and Druggists; and as every charge was decided on its own merits, the ground of each was carefully ascertained, and reference made to the customary nature of the business, as well as the character of the party implicated."

These regulations were further discussed and confirmed in the year 1846, when considerable excitement prevailed, and energetic measures were taken by Chemists and Druggists to prevent the passing of an Act then contemplated, which would have placed the sale of spirit of wine by Chemists under very severe restrictions.

Deputations waited on the Chancellor of the Exchequer, and on the Board of Excise; the subject was fully discussed, and a detailed report was published in this journal (vol. vi.).

In the course of these communications, the difficulties of the case and the intentions of the Board were explained. It appeared that the revenue had been extensively defrauded by the illicit manufacture and sale of spirit of wine in small quantities, and it was found necessary to pass a law for the purpose of giving the officers of the Board increased powers of inspecting premises and exercising a supervision over the vendors of spirit. The law prepared for this purpose was so framed as to affect, to a serious extent, all vendors of spirits or spirit mixtures, including Chemists and Druggists.

Upon a full representation of the hardships of the case, Mr. Wood, the Chairman of the Board of Inland Revenue, explicitly stated, that it was not the desire of the Board to interfere injuriously with the legitimate functions of the Chemist and Druggist; and the Chancellor of the Exchequer ultimately consented to remove the objectionable provisions from the Bill.

The following extract of a letter dated Downing Street, September 3, 1846, briefly states the intention of the Government, and shows the desire to protect the interests of the trade:—

"The only object the Government has in view is to prevent illicit distillation, and to frame the measures necessary for that purpose in such a manner as to impose as little inconvenience as possible on the trade of which you are a member. The fair dealer is equally concerned with the Government in promoting this object, and the Chancellor of the Exchequer is sure he may rely on the concurrence and assistance of the respectable members of the trade in

framing any further measures which may hereafter be necessary to prevent the frauds, on account of which the Bill in question was introduced."

Under the circumstances above detailed, and with the mutual understanding between all parties, but little, if any, inconvenience (so far as we are aware) has of late been suffered with regard to the sale of spirit of wine by Chemists. It is understood that the sale for *medicinal purposes* is permitted, but under no other pretext; and it has also been repeatedly stated that no colourable admixture of other ingredients, with a view of evading the law, would be permitted, and that any attempt at evasion would be dealt with as an aggravation of the offence.

We attribute the misfortune of the defendants in the case before us to their disregard of the above caution. The sale of spirit of wine under the name of *tinctura hordei*, distinctly shows either that the regulations of the Board are misunderstood, or that there is a desire to evade the law. The proper Latin name for spirit of wine is Spiritus Vini Rectificatus. As such it might have been sold *for medicinal use:* but it is not a tincture of barley, and the adoption of such a name by way of disguise, is a practice which cannot be sanctioned, as it is a violation of the mutual understanding entered into at the period before referred to, and affords a *primâ facie* ground for suspicion.

From what has already transpired, we are persuaded that any suggestions of a practical nature for an amendment of the law would meet with due attention on the part of the Government and the Board of Inland Revenue, but it would be injudicious to make the case before us a ground of appeal.

THE PROVISIONS OF THE MEDICAL BILL.

Several correspondents have made inquiries respecting the probable effect of the Medical Bill on the interests of Chemists. The 12th clause, as at present worded, would expose all persons not registered as medical practitioners to summary conviction before a magistrate, with fine or imprisonment, for prescribing or administering medicines for gain or reward, &c. We have ascertained that it is the intention of the promoters of the bill to amend this clause, so as to obviate its otherwise injurious interference with the Pharmaceutical or Dispensing Chemist.

The Bill came under the notice of the Library and Museum Committee, as reported in the Transactions of the Society for the present month. It has subsequently passed the second reading, with the understanding that the amendments and additional clauses will be proposed in Committee. The Bill is opposed by the Provinclal Medical and Surgical Association, as it differs from the one previously prepared and advocated by that Association. Under these circumstances, it is likely that considerable discussion will take place in Committee, and if the Bill should pass through that stage, which is very doubtful, it will be reprinted as amended, in time for further consideration before the third reading.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, March 1st, 1854.

DANIEL BELL HANBURY, TREASURER, IN THE CHAIR.

Donations to the Library and Museum were announced as follows:—

The Chemist, Nos. 1 and 5. New Series.
The Dublin Hospital Gazette, Vol. I., Nos. 1 and 2.
The Asylum Journal, Nos. 1 and 2, from Mr. S. Highley.
The Literary Gazette, from the Publishers.
Journal of the Society of Arts, from the Society.
Journal of the Photographic Society, from the Society.
Report of the Council of the Art Union of London for 1853, from the Council of the Art Union.
Proceedings of the American Pharmaceutical Association at the Annual Meeting held in Boston, August 24th, 25th, 26th, 1853. Two Copies.

Factitious Dragon's Blood, and Specimen of Kola Nut, from Mr. D. Hanbury.
Fruit of Argania Sideroxylon from Morocco, from Sir W. J. Hooker.
Root found in Sumbul, from Mr. C. M'Culloch.
Fruit and Leaf of Nephelium Litchi, from Mr. G. W. Smith.

A specimen of the Medal which the Council have had prepared to be given as a Prize at the Class Examinations in the School of Pharmacy, was exhibited.

The following papers were then read;—

SECOND NOTICE OF NEW OR RARE ARTICLES IMPORTED INTO LIVERPOOL.

BY T. C. ARCHER, ESQ.

In the first article upon this subject, at page 312 of the present volume, I mentioned two articles which have since given rise to some discussion. The first, *Balsam seeds*, which I believed to be Myrospermum pubescens. Upon this subject, Mr. Daniel Hanbury has since furnished me with some very valuable suggestions, and he is of opinion that the seeds in question are those of M. Pereira (Royle). There is, however, I imagine, some confusion still existing amongst the species of this interesting genus.

Another article, the *Agar-agar*, of Ceylon, has called forth some remarks from my friend Mr. P. L. Simmonds, whose long experience in colonial matters entitles his opinion to much consideration, and I am very glad to see that he has published a history of the commercial products of the vegetable kingdom. I have not yet seen this work, but am sure it must necessarily contain much valuable information. But Mr. Simmonds has, I apprehend, misconceived the exact meaning of the question mooted by me. Dr. Pereira described Agar-agar or Ceylon moss, under the name of Plocaria candida, and in his invaluable *Materia Medica*, he figures this plant. Now the article imported into Liverpool, has been received under both names, and most certainly is not P. candida. Mr. Edmund Greaves, the very able curator of the Pharmaceutical Society, tells me, he believes it to be Gigartina spinosa (Turner). I have not been able to trace the characters of the genus Gigartina (Harvey), and in the absence of specimens exhibiting the twofold fructification of that genus, I must consider the name furnished to me by Mr. Alexander Smith of the Kew Museum, as the correct one. With respect to Mr. Simmonds's remarks, he must, however, pardon me, if I say that he is in error concerning the article

itself, as well as the question I originated. Mr. Simmonds describes Agar-agar under the very erroneous name *Tripe de roche*, which belongs only to certain species of Gyrophora, peculiar to northern seas, and used as food by the natives of Arctic America. Moreover, it is quite clear that there are two articles, both occasionally called Ceylon moss, but only one of them Agar-agar, hence the error which I endeavoured to point out. One of these is, undoubtedly, Plocaria candida, but that is not the Agar-agar, the other is, and whether it be Fucus spinosus or Gigartina spinosa, is a question which a very little examination will elucidate. It is worthy of remark, that Dr. Pereira gives three analyses, viz., those of Dr. O'Shaughnessy, Bley, and Riegel. In the first, there is fifteen per cent. of starch; in the second, it is not mentioned; and in the third, only six per cent. is recorded. Does not this imply that the plants examined by O'Shaughnessy and Bley were not the same species? The Plocaria is remarkable for its starch. The Fucus for its jelly.

We are much indebted to Mr. Simmonds for the statistics of the article, and I presume the quantity shown to form the commerce in this substance is a typical error. A *picul* is stated to be 133lbs., and the quantity shipped at Singapore about 10,000 piculs, or 12,500 tons annually. Should it not be 593¾ tons?

We lately received at this port a few bales of huaco, or guaco, from Valparaiso; I believe it was immediately sent to France. Under this name Mr. Redwood, in the *Supplement to Pharmacopœia*, mentions the composite plant Mikania guaco, but remarks that "Dr. Hancock asserts that the real alexepharmic *guaco* is an aristolochia." Dr. Lindley, in "*Vegetable Kingdom*," says Aristolochia anguicida is probably the guaco of the Colombians. A small specimen was sent to me, which consists of several twigs of a hard-wooded shrub, upon which are two or three imperfect leaves, ovately-lanceolate in form, and slightly tomentose. I have examined a section of the wood, and am enabled to say that no doubt can possibly remain as to its being an aristolochia, the peculiarities of that remarkable genus being strongly marked in my section, the woody fibres being arranged in beautifully regular radiating wedges, without any concentric rings. It is very remarkable that so many of the vegetable products of Central and South America have alexepharmic virtues attributed to them, and particularly that they are stated to have great efficacy in resisting the poison of serpents' bites, whereas, upon examination, we are unable to find any quality in them which will warrant our belief in their antidotal virtues. The seeds of Simaba cedrone furnish a striking example of this. I think the tasteless wood of the huaco will be found to be another. I am inclined to believe that the information obtained by Europeans from the native Indians respecting these remedies is incorrectly understood, and I venture to advance a supposition which has occurred to me upon this subject.

All through Central America there are traces of the Aztec religion, in which the serpent figured as one of the most dreaded deities. It is not improbable that all diseases were attributed to the evil influence of this much-dreaded deity; consequently, everything found to possess curative powers, would be looked upon as powerful to resist the serpent influence or poison. This may be deemed a fanciful hypothesis, but I feel sure some explanation is needed to account for the very large number of plants said to have this power in a country where, although many very deadly ophidians exist, there is nevertheless no evidence of much mischief occasioned by their bites.

I have received also a specimen of *China root* from Jamaica, being a sample of a small quantity recently imported. It is a large piece of a dark, reddish-brown rhizome, lighter in colour on the outside; it is of irregular shape, like the rhizome of the common blue-flag Iris, and tolerably smooth; it has a brittle fracture. I imagine it to be the Smilax Pseudo-China.

It may happen, in recording the importations of Materia Medica into Liverpool, that I may mention products which are common in the London markets.

I must, however, crave indulgence, as the difficulties of our position here are by no means trifling. We are immersed in business, and have no collections or fine libraries similar to those of the metropolis to refer to. I, however, think most will agree with me, that an article already known had better receive a second notice, than that one hitherto unknown should escape observation; besides, the number of letters I received from the readers of the Journal, in consequence of my article in the January number, shows me that a very healthy spirit of inquiry is in existence, which is likely to be increased by adding to the stimulus.

Mr. Redwood said the term Guaco, referred to by Mr. Archer, was not only applied in South America to several vegetables, but also, sometimes, to mineral products. He had recently received two samples of salt, under the name of Sel de Guaco, which consisted principally of chloride of sodium.

ADDITIONAL DIRECTIONS AND IMPROVEMENTS IN THE PROCESS FOR THE MANUFACTURE OF ARTIFICIAL TOURMALINES.

BY WILLIAM BIRD HERAPATH, ESQ., M.D.,

Vice-President of the Bristol Microscopical Society, Member of the Bristol Philosophical and Literary Society, &c. &c.

In the January number of this Journal the author gave a formula for the production of these crystals of large size, so as to be available for optical purposes.

That formula succeeds very well when the temperature of the atmosphere in the apartment is 65°, and likely to be maintained at this point for three or four hours, falling gradually to 45° Fahr. in the course of the night. Under these circumstances it is rarely the case that some large plates are not discovered in the morning. These should be at once secured, or they will re-dissolve or sink, and thus be lost.

When the temperature does not fall below 50° or 55° Fahr. a different formula is necessary. Less spirit must then be employed, in order to render the compound less soluble in the menstruum.

Formula No. 2 may now be used most successfully.

(2) Take of Disulphate of quinine 100 grains,
Acetic acid (1.042) 4 fluid ounces,
Rectified spirit (0.837) 1 fluid ounce,
Spirituous solution of iodine 1 fluid drachm.

The crystals are produced more quickly by this formula than by the previous one; and in three or four hours must be removed, or the mother-liquid will quickly re-dissolve them. Many of the larger crystals become too heavy to float any longer and fall to the bottom of the flask, from whence they are not easily removed; still by the exercise of patience and some ingenuity they may be recovered, and fully repay for the trouble of cutting off the top of the flask, &c. &c., by producing a field wholly devoid of violet light upon crossing two plates, especially when examined by daylight.

Formula No. 3.—I have recently succeeded in making these crystals of large size, by replacing the spirit of wine in No. 2 formula, by an equal quantity of hyponitric ether (sweet nitre). There is some advantage in using this solvent, as the crystals remain even for a week floating on the surface, without showing the least appearance of disintegration.

It is frequently the case in this experiment that the free iodine disappears very readily, the solution becoming nearly colourless; under these circumstances the compound does not form. If the temperature employed be too elevated, this is almost certain to occur; of course it is only necessary to add a second quantity of iodine solution, so that the liquid may retain its dark sherry colour during the cooling.

After making the addition of the tincture of iodine in either of the previous

formulæ, it is necessary to continue the heat of the spirit lamp for a short time, to dissolve all the cinnamon brown iodide of quina first deposited, so that the solution shall become perfectly clear dark sherry-wine colour, and then to filter the solution rapidly through white porous paper into a *perfectly clean* wide-mouthed Florence flask, mattrass, or beaker, and to attend to the following conditions:—

First, it is well to have at least six flasks half filled with solutions made by the above formula, so as to ensure the production of foliaceous plates in some one or more of them; according to the state of the atmospheric temperature as previously explained.

2ndly. It is more convenient to set these at work as nearly simultaneously as possible, and to well watch them during the next three or four hours, especially if formula No. 2 be employed, so that the produce may be caught at the most favourable moment. If any foreign bodies, as hair, dust, or filaments of paper, are floating in the solutions, the broad plates do not form, as those particles act as nidi for the crystals, and fatally hasten the process of deposition, so that the produce is small and confused.

3rdly. It rarely or never happens that we obtain these large plates at the first attempt, it is often necessary to re-dissolve and crystallize two, three, or four times before we find any large enough for optical purposes: the reason is, that the process of crystallization is, at first, much too confused and rapid to allow of the requisite arrangement of the particles or prisms, so as to constitute the broad compound optical leaflets.

4thly. It is always desirable not to raise the temperature to the boiling point when re-dissolving, as spirit and iodine are both then lost, and the formative power of the mother-liquid becomes impaired, and, at length, completely lost, in consequence of the relative proportions of acid and spirit being so altered by continued distillation of the latter.

5thly. It is always better to add four or five drops of the tincture of iodine after re-dissolving, in order to produce an atmosphere of iodine vapour above the liquid; this, in condensing, starts an early surface crystallization, whilst the mother-liquid is sufficiently charged with the compound.

6thly. These compound foliaceous plates having "crenated edges," consist of prisms arranged side by side, in various forms, but frequently producing disks of considerable size, the component atoms of which are all arranged in the same optical direction; but at other times, crystallization appears to start from a central point, and then the foliaceous laminæ (still consisting of adherent component prisms or sections of rhombic plates) radiate like the petals of a flower; under these circumstances, the *corolla*-shaped disk would be useless; but either *petal*, if large enough, would be serviceable, as in the latter all the atoms would be in the same relative plane with regard to polarized light; consequently, it is necessary to select for mounting, the *most uniform* plates, and not always the largest clusters, for these would have a "macled" appearance, and produce a beam of light polarized in more than one plane, and therefore creating confused results in the polariscope.

Having obtained these crystals by one of the above formulæ, and caught one upon the glass circle as before described, it is better to submit it to a process of washing (before drying), so as to remove the mother-liquid and get rid of the interference of crystals of sulphate of quinine deposited either beneath or upon the plate; in my last paper "cold distilled water imbued with iodine" was recommended for this purpose.

However, as the effect I then ascribed to iodine is by no means certain, and as it sometimes also injures the plate by depositing the brown iodide of quina upon its surface, it is far better to employ a saucer or evaporating basin full of a saturated solution of Herapathite in a mixture of distilled water and one-eighth of its bulk of acetic acid for this purpose. The acetic acid greatly hinders the tangential flying off of the crystalline plates from the glass disks upon *our*

slowly and *very cautiously immersing them in a horizontal position* beneath the surface of the water, and if this should occur, the plate is frequently broken; should it float off, it must be re-caught upon the glass disk as before, and then be cautiously dried by absorbing all moisture by bibulous paper as before, and drying it as rapidly as may be consistent with safety, by exposure to air at 50° or 60°.

If it be considered desirable, it may be exposed for a short time to the vapour of iodine; this is best accomplished by means of solid iodine—the tincture was once recommended, but the alcoholic vapour renders it brittle—a defect which is not found with the solid substance.

I have been recently occupied, in conjunction with my friend Mr. Thwaites, in making some experiments upon different media for mounting these crystals. Those principally employed have been iodized almond oil and pure elaine, also slightly charged with iodine, as well as glycerine similarly iodized. The mode of using these is to prepare a saturated solution of iodine in either medium, then dilute it with four times the quantity of pure medium for use. Having placed the circular disk on the table, with a very minute drop of either substance on its centre, invert the plate carrying the crystal (this being downwards) upon the oil, elaine, &c., press together slightly, and then, if too much medium has not been used, the plates are just kept apart by the interposed fluid. The edges are then surrounded or painted with a solution of gum arabic, slightly toughened by the addition of a little isinglass or gelatine. This is a very rapid mode of mounting, but not certain or safe; sometimes the edging of gum cracks, air is admitted, the definition of the plate is lost, and its brilliancy for the polariscope much damaged. Oil and elaine appear to dissolve and disintegrate the crystals.

I therefore infinitely prefer the etherial and iodized Canada balsam.

Crystals thus mounted keep without change or disintegration; some of the author's plates have been so prepared for months, and are *still perfect*, whilst others, mounted very recently in iodized oil, or elaine, or glycerine, have shown symptoms of destruction in as many weeks or days even. I have some which are quite as good as ever after *three years*' wear; these were mounted in fluid Canada balsam. When disintegration occurs, it appears to be greatly influenced by imperfection in the washing process, for those plates which have been mounted with crystals of sulphate of quinine beneath them, certainly break up and dissect themselves with great rapidity; it appears to be produced by some unknown molecular action going on, and a re-arrangement of the atomic constituents. The plates appear to become henpecked by minute parallelogrammatic holes; these begin at the edges and go onwards through the disk, rendering the plate useless.

The etherialized Canada has no action on the plates, however; it is perfect as a mounting fluid, and it dries very readily; a few days' exposure to air of 60° or 70° being alone sufficient for this purpose.

Turpentine has no solvent power over Herapathite, even at a boiling temperature, therefore, fluid Canada may be employed: I consequently was in error in ascribing the disintegration to that medium; I have since found that the crystals *must be washed* to render them secure for mounting in it; the only objection to this medium is, it dries so slowly.

The object of using the iodized compound is to give a black tone to the field; this it certainly accomplishes; the periodized crystals, when examined *by daylight*, are black as midnight, even if the plates are no thicker than gold-leaf, but an intense lamp or gaslight appears to pass through them with a violet hue, perhaps more inclining to brown-red. This is an unpolarized ray, and it cannot be obstructed by tourmaline or Nichol's prism. It requires four thicknesses of Herapathite (all parallel) to stop this last portion of the beam; it is doubtful whether the effect of periodizing the plate is lasting: I think not.

When it is absolutely necessary to obtain a perfectly black field with a total

stoppage of all the incident rays (upon "crossing" the two crystals), it is much the better plan to employ a thicker plate of this substance: such a crystal will be generally found in the flask at the bottom of the mother-fluid. There is more trouble requisite in obtaining perfect plates, free from all intervening crystals, but the experimenter is generally repaid in the end by the perfection of the polarizing medium.

When the selenite stage is employed, the thinner and violet-coloured crystals are far preferable to those which give a black tone to the field; as the colours are more brilliant, and the flood of transmitted light much greater, so that we are enabled to use a less illuminating power. I am not in the habit of using an achromatic condenser with my polarizing apparatus, which probably accounts for some discrepancies in the results of observations made by different experimenters upon the same crystalline plates: those crystals which will transmit the violet rays when strongly illuminated by gas or lamp light, will not do so when the instrument is used in daylight, or with a plane instead of a concave mirror, and without the achromatic condenser.

If it be necessary to obtain a most decidedly black field, the violet rays may be readily absorbed by interposing a thin plate of sulphate of copper beneath the polarizing plate of Herapathite and the source of illuminating power.

I have recently employed a plate of this substance, one-twentieth of an inch thick, cut on a hone, polished and mounted between two plates of thin glass in Canada balsam, as a means of correcting the defects of the thinner plates of these new tourmalines*—this substance possessing the power of absorbing the violet rays of the spectrum in a pre-eminent degree. In order to succeed in this experiment, it is necessary that the sulphate of copper should be inclined at a certain angle to the plane of primitive polarization, as it is a substance possessing two neutral axes, or planes of no-depolarizing power, the position of which may be easily found, and their direction marked upon the support, so that the intervening plate may be always inserted at the angle of its greatest activity. Professor Stokes has lately, in a letter to me, suggested the employment of a glass laden with the oxide of copper as a means of attaining the same end. Having, therefore, prepared a boracic glass, coloured by the black oxide of copper, I have used it effectually as an absorbent medium for counteracting the violet-red colour of the polarized beam. But although it offers great and manifest advantages when the new tourmalines are crossed at right angles, yet, upon revolving the superior crystal, and therefore bringing the two plates into a parallel position, we have a blue colour in the field, which must assuredly alter the colours of depolarizing media: it is, however, a very agreeable light to work by, as the intense yellow of gaslight is much mellowed down and counteracted by it. This corrective medium would be inadmissible when the selenite stage is employed, as the tints would be materially changed by its absorptive agency.

The mode of making this glass is simply to dry powdered biborate of soda in a crucible by the heat of an ordinary fire; again reduce the effloresced mass to powder, and mix it with a small quantity of the oxide of copper, such as is generally used in organic analysis, then introduce the mixture into a platinum crucible, and with a steady, long-continued heat, thoroughly vitrify it, pour it out upon a flat slate, clear metallic or Wedgewood-ware surface, and press it while still soft into a flattened plate. Upon cooling, a portion must be quickly ground down upon a hone, polished, and then mounted in Canada balsam between glass; the unmounted boracic glass may be kept for any length of time in turpentine without change, but in the air it effloresces, and becomes opaque and useless.

I have been asked for a process by which the quinine may be recovered from the mother-solutions and from Herapathite itself. The following will be found very successful.

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* A solution of the sulphate or nitrate of copper in water will equally succeed in producing a black field.

It is merely necessary to boil the mother-liquids with the Herapathite crystals, to add a little solution of some soluble sulphuret, say potassium or ammonium, to convert the iodine into hydriodic acid, to evaporate to dryness so as to expel the spirit and acetic acid, by a water-bath, to re-dissolve the remaining salt in just sufficient boiling distilled water, to filter, and to set aside to crystallize; when cold, collect and dry the crystals by expression, and by a gentle heat. The mother-liquid will contain acetate and some sulphate of quinine; add to it, when cold, an alkali in solution—potassa, soda, or ammonia, or the carbonates of these; collect the separated alkaloid on a filter, and dissolve it in boiling water acidulated with sulphuric acid; *if this be not in excess*, the disulphate of quinine crystallizes on cooling, and the loss is very slight.*

32, *Old Market Street*, *Bristol*, *February* 18*th*, 1854.

Mr. J. Peel, Chemical Assistant to the Rev. Mr. Pritchard, of Clapham, said that at Mr. Pritchard's desire he had made a great many experiments on the manufacture of good crystals of iodo-sulphate of quinine. He found the method described by Dr. Herapath very successful for the production of large crystals when the room in which the process was conducted was maintained at a pretty uniform temperature between 37° and 55° Fahr., a temperature of from 45° to 47° being the best. If the broad, flat crystals were not formed, he added a little more acetic acid mixed with spirit, and re-dissolved the crystals with a gentle heat. When the solution had been repeatedly warmed, however, the crystals formed were not good, and the mother-liquor acquired increased specific gravity; in which case the solution was reduced to the specific gravity mentioned by Dr. Herapath, namely ·986, at 82° Fahr., by adding proof-spirit and a little tincture of iodine. After this treatment good crystals were frequently obtained.

The principal difficulty which he had experienced was, to produce crystals which, when crossed, would give a black field, and which would retain this property. The crystals, after being caught, were not washed with iodized water, but merely dried with blotting-paper. These crystals, on being crossed, invariably gave a dark red field both by daylight and by gaslight. The crystals, after being thoroughly dried, were placed under a glass shade with tincture of iodine; but in thus treating them the spirit was sometimes found to produce an injurious effect, and dry iodine was therefore substituted for the tincture with advantage. After exposing them to the iodine vapour in this way until they acquired a pale yellow colour by transmitted light, they gave, on being crossed, a perfectly black field by gaslight and by daylight.

Some of these crystals were mounted in iodized Canada balsam, and some were merely placed between thin plates of glass and the edges cemented together; but in all these cases it was found that, after a period of from twelve hours to two or three days, the crystals lost the property of giving a black field by gaslight, although some of them continued to produce the required effect by daylight. In consequence of these results being so generally obtained, other media for mounting the crystals were tried, and that which was found to answer best was a solution of pure gum iodized. The solution of gum was made of about the consistence of Canada balsam, and then iodized. Crystals mounted in this medium continued to give a black field after being kept for a long time, and very few of them lost their full polarizing power. This method of mounting had certainly proved, in his hands, the most successful of any he had tried. The solution of gum also possessed the advantage of rapidly drying.

Mr. Giles observed that every additional new fact relating to polarized light was interesting and important, as it afforded the means of obtaining clearer views on a subject which was generally felt to be obscure and difficult of comprehension. Dr. Herapath's discovery brought the phenomena of polarized

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* This disulphate may be again employed for the manufacture of the crystals—so may the neutral sulphate of quinine obtained by the first part of the process.

light within the means of observation of every Chemist, who could now construct his own polarizing apparatus, and no doubt the result would be that the subject would become much more popular than heretofore.

Mr. Redwood referred to the circumstances under which the iodo-sulphate of quinine was first observed, and the manner in which Dr. Herapath had followed out the investigation of the subject. He thought it afforded an instructive illustration of the value of minute observation and of perseverance in the investigation of phenomena, however trivial they may at first appear. From such beginnings important results not unfrequently followed, as in the case of Dr. Herapath's salt. The influence of the iodine in this salt, and the advantage found to result even from iodizing the medium in which the crystals were mounted, might suggest the analysis of natural polarizing tourmalines with the view of ascertaining whether they contain iodine. Several analyses of tourmalines had been made, but not probably with special reference to iodine.

Dr. Garrod thought the polarizing effect of Dr. Herapath's salt depended upon some peculiarity of molecular arrangement rather than chemical composition. Having been himself struck with the similarity of appearance between Dr. Herapath's salt and murexide, he had made some experiments with the latter substance, and found that it produced the same polarizing effects as the iodo-sulphate of quinine.

DR. STENHOUSE'S CHARCOAL RESPIRATOR FOR PURIFYING THE AIR BY FILTRATION.

Mr. Allchin brought this subject under the notice of the meeting, and exhibited the apparatus and some of its effects. The respirator, which was made by Messrs. Ferguson and Sons, of Smithfield, under the direction of Dr. Stenhouse, consists of a wire-gauze case, made sufficiently large to cover the mouth and nose. The edges are formed of lead, and are padded and lined with velvet, so that it can be easily made to fit tightly to the face, to the exclusion of all air except that which passes through the instrument, which is filled with freshly burned charcoal. There is also a small opening closed with a wire-gauze screen, by means of which the charcoal can be removed and re-introduced at pleasure.

The following is Dr. Stenhouse's paper on the subject, which, with a slight modification, has already appeared in the *Journal of the Society of Arts*:—

"The powerful effects of freshly burned wood charcoal, especially when coarsely powdered, in absorbing gases and vapours, have been long known. Hence the limited extent to which charcoal has been occasionally employed to sweeten fetid water, and animal substances in the incipient stages of putrefaction. Sufficient attention has not, I think, however, been hitherto bestowed upon a second and still more important effect which charcoal exerts upon those complex products of decomposition; viz., that of rapidly oxidizing them, and resolving them into the simplest combinations they are capable of forming.

"When coals or wood are burned with an inadequate supply of air, a variable amount of intermediate or secondary products is generated, constituting what are called soot and smoke; when, on the other hand, the combustion of the fuel is conducted with an adequate supply of oxygen and a sufficiently high temperature, carbonic acid, water, ammonia, with perhaps a little nitric acid, are almost the sole products.

"The putrefaction of animal and vegetable substances is likewise, in general, a process of imperfect oxidation. Hence, under ordinary circumstances, when this is the case, a variety of more or less complex secondary products is formed, which usually possess very disagreeable odours, and exert exceedingly injurious effects upon the animal economy. To these substances the general name of *miasmata* has been given. Not much is known of their nature, but they are believed to be heavy, complex, nitrogenated vapours, which are decomposed by oxygen, chlorine, sulphurous acid, nitric acid, and other disinfecting agents.

"My attention was particularly drawn to the importance of charcoal as a disinfecting agent by my friend John Turnbull, Esq., of Glasgow, the well-known extensive chemical manufacturer. Mr. Turnbull, about nine months ago, placed the bodies of two dogs in a wooden box, on a layer of charcoal powder, of a few inches in depth, and covered them over with a quantity of the same material. Though the box was quite open, and kept in his laboratory, no effluvia was ever perceptible, and on examining the bodies of the animals at the end of six months, scarcely anything remained of them except their bones. Mr. Turnbull sent me a portion of the charcoal powder which had been most closely in contact with the bodies of the dogs. I submitted it for examination to one of my pupils, Mr. Turner, who found it contained comparatively little ammonia, not a trace of sulphuretted hydrogen, but very appreciable quantities of nitric and sulphuric acids, with acid phosphate of lime.

"Mr. Turner subsequently, about three months ago, buried two rats in about two inches of charcoal powder, and a few days afterwards the body of a full-grown cat was similarly treated. Though the bodies of these animals are now in a highly putrid state, not the slightest odour is perceptible in the laboratory.

"From this short statement of facts, the utility of charcoal-powder, as a means of preventing noxious effluvia from churchyards and from dead bodies in other situations, such as on board ship, is sufficiently evident. Covering a churchyard to the depth of from two to three inches with coarsely powdered charcoal, would effectually prevent any putrid exhalations ever finding their way into the atmosphere. Charcoal powder also greatly favours the rapid decomposition of the dead bodies with which it is in contact, so that in the course of six or eight months little is left except the bones.

"In the modern systems of Chemistry, such, for instance, as the last edition of '*Turner's Elements*,' charcoal is described as possessing antiseptic properties, while the very reverse is the fact. Common salt, nitre, corrosive sublimate, arsenious acid, alcohol, camphor, creasote, and most essential oils, are certainly antiseptic substances, and, therefore, retard the decay of animal and vegetable matters. Charcoal, on the contrary, as we have just seen, greatly facilitates the oxidization—and, consequently, the decomposition—of any organic substances with which it is in contact. It is, therefore, the very opposite of an antiseptic."

I find, indeed, a recognition of the oxidizing action of charcoal in the fifth edition of *Brande*'s *Manual of Chemistry*, at page 511, where the following paragraph occurs:—

"According to Vogel, when recently ignited charcoal, which has been cooled under mercury, is put into a jar of atmospheric air, it absorbs the oxygen of the air to a much greater extent than the nitrogen.—*Schweigger's Journal*, iv. A piece of well-burned charcoal, cooled under mercury, and then introduced into a mixture of oxygen and sulphuretted hydrogen gases, rapidly absorbed them, and then became ignited and caused explosion.—*A. Taylor.*"

"The object of the present paper, however, is chiefly an application of the absorbent and oxidizing properties of charcoal, which, so far as I am aware, has never yet been proposed; viz., to employ a new species of respirator filled with powdered animal charcoal, to absorb and destroy any miasmata or infectious particles present in the air in the case of fever, and cholera hospitals, and of districts infected by ague, yellow fever, and similar diseases. I have got such a respirator made by Ferguson and Sons, Smithfield, instrument makers to St. Bartholomew's Hospital. It fits closely to the lower portion of the face, extending from the chin to within half an inch of the eyes, and projects about an inch on either side of the mouth. It therefore includes the nostrils as well as the mouth. The frame of the respirator is made of thin sheet-copper, but the edges are formed of lead, and are padded and lined with velvet, so that it can be easily made to fit tightly to the face. The powdered charcoal is kept in its place by means of two sheets of fine wire gauze, from a quarter to an eighth of an inch apart. As

the body of the apparatus is metallic, it has been electro-plated with silver. Electro-plating the respirator with platinum or gold would certainly be an improvement. There is a small opening closed with a wire gauze screw, by means of which the respirator can be filled with charcoal or emptied at pleasure. The respirator is kept in its place by an elastic band passing round the back part of the head. I have employed *animal* charcoal as the more porous substance, but I* should think wood charcoal would answer perfectly well. The object in view is, by filtering the air through such a porous substance as animal charcoal, to intercept the miasmata which may have got mixed with it.

These, I think, cannot fail to be absorbed by the pores of the charcoal, where they will be rapidly oxidated and destroyed by the condensed oxygen, with which they will be brought into the most intimate contact. The probability of this expectation being realized is greatly strengthened by the results of repeated trials with the respirator on certain noxious and offensive gases, such as ammonia, sulphuretted hydrogen, hydrosulphate of ammonia, and chlorine. I have found that air, strongly impregnated with these gases, and which could not be respired for any length of time, under ordinary circumstances, may be breathed with impunity when the charcoal respirator is worn, the odour of these gases being rendered almost, if not altogether imperceptible. Any other highly porous substance, such for instance as spongy platinum. or pounded pumice-stone, might probably be found to answer perfectly well for filling the respirator, but I have selected charcoal as the cheapest and most easily available material.

"While the filtration of water through charcoal powder and other porous substances has been advantageously practised for many centuries, the object in view being to deprive the water of numerous impurities diffused through it, which produce injurious effects on the animal economy, it is certainly somewhat remarkable that the very obvious application of a similar proceeding to the lighter fluid in which we live, viz., air, which not unfrequently contains even more noxious impurities floating in it than are usually present in water, should have, up to the present time, been so unaccountably overlooked.

"In addition to the precaution of wearing such a respirator as that just described, persons necessitated to live in especially pestiferous districts might have their houses made as air-tight as possible, with the exception of such openings as are necessary to maintain a proper amount of ventilation. By means of these openings the air could be freely admitted through gauze into which the requisite quantity of charcoal had been quilted. The doors of such houses could also be made double, and be constructed of coarse cloth, likewise containing a thin layer of charcoal powder. As an additional precaution, if it were thought desirable, the walls, floors, and ceilings of houses in very unhealthy districts, could be easily lined with mattresses filled with a couple of inches of charcoal powder. Were these and similar precautions adopted, I confidently anticipate that Europeans would be enabled to reside with comparative impunity in some of the hitherto most pestilential districts of the world."

[The tubs containing the animals, covered with about an inch of charcoal, were then shown to the meeting, but not a trace of unpleasant smell was perceptible.]

Mr. Whipple could bear testimony to the great power of the charcoal respirator, which Dr. Stenhouse had allowed him to try at St. Bartholomew's Hospital. He was so satisfied of its value for certain purposes, that he intended keeping one for use in the Laboratory.

Mr. Jacob Bell alluded to the very important application which was made of charcoal, and especially of peat charcoal, in deodorizing excrementitious matter to be used as manure.

Mr. Allchin thought that in this application of charcoal it was important to

* Since the above was written, I have ascertained that wood charcoal is even more efficacious than animal charcoal.—J. S.

bear in mind, that, according to Dr. Stenhouse, the charcoal not only deodorized, but at the same time oxidized and destroyed those substances, such as urea and ammonia, which were the most valuable constituents of manures.

Dr. Garrod thought that sufficient evidence had not yet been adduced by Dr. Stenhouse to prove that charcoal caused the oxidation of substances which were absorbed by it. Certainly such an effect was not quickly produced, for when the active principles of vegetables were absorbed by it and rendered inert, as he had proved by numerous experiments, they could afterwards be extracted in an unaltered state.

Mr. Porrett said, that from what had been recently advanced on the subject, it would appear that charcoal exerted a twofold action; namely, that of absorbing certain substances and condensing gases within its pores, which had long been known, and that of causing oxidation through the influence of condensed oxygen contained in its pores, which was a new idea. This second action was similar to that exerted by spongy platinum. He thought it was important to ascertain from experiment the extent to which each of these actions took effect in certain cases.

LIBRARY AND MUSEUM COMMITTEE.

At a Meeting of the Library and Museum Committee, March 16, Mr. Henry Deane, President, in the Chair;

A list of Books was considered and recommended to the Council for purchase.

The Bye-laws having been referred by the Council to the Committee for revision, were discussed, and their further consideration adjourned until the 23rd.

The President laid before the Committee two letters which he had received from Messrs. Prichard and Collette, on the subject of a leading article in the last number of the *Pharmaceutical Journal*, which were handed to the Editor, who was requested to publish them, together with the substance of a verbal communication which the President made at the same time.

The Secretary laid before the Committee the following communication, which he had received from Mr. W. Bojers, of Port Louis, which was ordered to be published in the Transactions of the Society, and the seeds referred to were ordered to be pressed, with a view of introducing the subject, with the result, at the next Pharmaceutical Meeting:—

ON THE OIL OF ARGEMONE MEXICANA.

TO THE SECRETARY OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, LONDON.

Sir,—I have read with great interest in the *Pharmaceutical Journal*, vol. xii., No. 6, December 1, 1852, an article by Dr. W. Hamilton, M.B., on the successful application of the oil of *Argemone Mexicana*, as a remedy for Asiatic Cholera, which remedy, according to Dr. Hamilton's assertion, has been already and beneficially tried in Jamaica.

As the plant grows spontaneously and in great abundance with us, I waited for the proper season at which the seeds are ripe: I have endeavoured to collect them in such a quantity as to enable me to extract the oil from them, but having failed in contriving any adequate and sufficiently strong machinery for that purpose, I therefore hasten, without much loss of time, to forward to you a certain portion of these seeds (twenty-five pounds), in the hope that you may have a proper machine at your command which will enable you to extract the oil, and make experiments with it according to the wishes expressed by Dr. Hamilton on behalf of your Society in the above-mentioned article of your Journal.

Besides this, we are aware that the cholera has again made its appearance in England, and is perhaps at this very moment making its numerous victims in the midst of your metropolis. This sad circumstance will offer to the Council of your Society a good opportunity of trying the effects of this new remedy, and I

shall feel very much obliged for any communication from you with regard to its successful application in checking the progress of this fearful malady.

I remain, Sir, your most humble Servant,

Royal College, Port Louis, 19th Nov., 1853. W. Bojers, V.P.

Adjourned Meeting, March 23.

The Bye-laws were further considered, and the President reported that he had seen the solicitors of the Society, who recommended that under existing circumstances no alterations should be made in the Bye-laws, except such as appeared absolutely necessary. Two alterations were proposed, which will be referred to the Council, and if approved will be reported next month.

A copy of the Medical Bill was laid before the Committee. It was reported on authority that the promoters of the Bill intended to make some important amendments before proceeding further with it, and also that it was not improbable that the Bill would be withdrawn, in anticipation of the introduction of a Medical Bill by Lord Palmerston.

The Secretary reported that he had received the nominations of sixty-eight candidates for the ensuing election of the Council, of whom sixty-three had been nominated by one Member of the Society.

(The total number on the 24th, being the last day of nomination, was eighty-two.)

PHYTOLOGICAL CLUB.

March 8th, 1854.

ROBERT BENTLEY, F.L.S., PRESIDENT, IN THE CHAIR.

Several new Members were elected, and a list of candidates read and proposed.

The Secretary then made some observations on the relation of Meteorology to Botany. He thought the weather was a very proper subject for discussion in an association formed for the purpose of promoting the study of botany. Man was sensitively alive to every modification of the weather, but he could protect himself by artificial means from its extreme influences—whilst plants were exposed to all its changes—and it was of great importance to become acquainted with the causes that so materially affected their constitution. He then, by the aid of maps and diagrams, pointed out the principles on which the science of meteorology is founded, and gave a description of the physical and chemical constitution of the atmosphere, showing the two great currents that are constantly flowing from the equator to the poles set up by the action of the sun on the surface of the earth between the tropics—which modified by the diurnal and annual rotation of the earth, and by the relative distribution of the sea and land, gave rise to every variety of climate. Although the whole of organic nature is dependent on these phenomena, yet meteorology and botany had been cultivated as distinct sciences, and it had been reserved to M. Humboldt to draw out a general plan, indicating the direct bearing that climate had on vegetation. He divided each hemisphere into seven belts or zones of climate, each of which contained species peculiar to itself. The vegetation of mountains also presents on a small scale the image of that of the earth considered as a whole. The annual mean temperature of a place is not, however, the only circumstance which determines its peculiar vegetation. The effects of the lowest temperature of winter, as well as the highest temperature of summer, have also to be taken into consideration. Besides the vivifying influence of heat the chemical action of the sun's rays of light modify many of the constituents of a plant. Lastly, he drew attention to the conditions of the atmosphere which appeared to affect the health of plants. Blights in the wheat and in the potato, and mildew on the grape, had appeared simultaneously with great electrical disturbances of the atmosphere ; but although the subject was involved in great obscurity a more earnest spirit of observation was at present awakened, and no doubt valuable results would follow.

A communication from Mr. Gissing, of Worcester, was then read, entitled—

A FEW REMARKS ON THE COTYLEDON UMBILICUS.

I BELIEVE that a work on the popular uses of British plants among the lower classes of the English people, would prove both useful and instructive. Among other things, it would, I think, exhibit the fact that in many of the new remedies introduced into medicine, the practice of the village doctress has furnished the first hint to the supposed discoverer of new virtues in various plants.

The one plant, or "herb" as all wild plants are called by the common people, that I have now more particularly in view, is *Cotyledon Umbilicus*. This plant, it is well known, is very common in Devonshire, Somersetshire, and the south-west of England, as well as on the rocks in Wales and the counties bordering thereon.

In the former counties it grows chiefly on *banks*, and attains a much greater height than in its more rocky habitats. From Somersetshire I have seen specimens, the flower-stalks of which were two feet or more high, but plants growing in more mountainous situations, I have seldom seen exceed eight or ten inches. Perhaps I may say a few words here upon the shape of the leaf of the *Cotyledon Umbilicus*. In Monmouthshire, Gloucestershire, and Worcestershire, I have gathered plants with some of the root leaves *kidney-shaped*, and others *spathulate*, and *not peltate* as is usual. I am unable to state whether these leaves would afterwards have assumed the peltate form; but from the fact of several of the *other* leaves on these plants having their stalks at various distances from their edges, I thought there was a probability of their having been originally *reniform*, or *spathulate*. I know it is by no means a general rule for the leaf-stalks to be central, but the two circumstances united in one plant, caused the supposition that the peltate leaf might be a development of an earlier form. I name this fact because I have never before seen it noticed; if it be general, it is worthy of remark. The leaves of the *flower-stalk*, I know, are generally nearly *reniform*, but the leaves I have spoken of were growing long before the flower-stalk made its appearance.

One of the common names of "*Cotyledon Umbilicus*," is *kidney-wort*. Now we know, pretty certainly, that the other vulgar names, *penny-wort*, and *naval-wort*, are given from the *shape* of the leaves. Did the person who added to these names *kidney-wort* do so for the same reason, or from any supposed curative power? Most likely the latter; but still, bearing in mind the leaves I have spoken of, there is a possibility in favour of the former.

Respecting the medicinal use of the *Cotyledon Umbilicus*, it is well known to most Chemists and Druggists, that Mr. Salter, of Poole, introduced it a few years since as a cure for epilepsy, since which time it has been used, although I believe to only a limited extent, amongst medical men.

In Monmouthshire and Herefordshire I found, on inquiry, that the leaves were taken for urinal obstructions and "*fits*;" in Lancashire, amongst other complaints, they are likewise taken for "*fits*." In Herefordshire I find they are used for corns and warts; in Worcestershire they are used for the same purpose; hence they are called "*corn-leaves*." They are likewise used here to make a cooling ointment, and their juice is expressed and mixed with cream as a cooling lotion for sore faces or chaps in children; in the same manner as the juice of the houseleek (*Sempervivum tectorum*).

Whether Mr. Salter knew of its use amongst the common people for "fits," and examined for what *kind* of "fits" it was used, and found it to be epilepsy, of course I am unable to say, but I make no doubt it was used for what the people call "fits," very many years before Mr. Salter introduced it into the regular practice of medicine. For it is most unlikely that the people should have recently adopted it, as they generally are violently opposed to all innovations upon their time-hallowed customs. Witness the feeling still prevalent in many parts against vaccination. The word of a village doctress is much more powerful amongst the ignorant peasantry than that of the qualified practitioner. She is a remnant of a bygone age, and I doubt not, as surgeons penetrate more into remote districts, the rising generation will totally discard the only medical adviser of their forefathers. The doctress commenced her practice when it was almost the only mode of treatment; and when, if surgeons differed from her, it was only to prescribe more absurd and disgusting remedies; she kept it when medical men came to be comparatively frequent; and her "occupation" will only be fully "gone," when the class that now constitutes her patients has become intelligent enough to prefer science to quackery.

Ray says, that the root and leaves of *Cotyledon Umbilicus* (or *Umbilicus Veneris*,

as it was then named) were used for erysipelas, &c., and refers to Dioscorides and Galen. Dr. Hill, in his *Family Herbal*, gives it as a general cooling medicine, internally and externally. In the last edition of Gray's *Supplement to the Pharmacopœias*, it is said to be used in the same manner; and in Meyrick's *Family Herbal* it is given as cooling and diuretic, and good for burns; but in none of these are "fits" named. Whether the authors disbelieved the utility of the plant in these diseases, or whether they were ignorant of its use in such cases, I cannot tell. It is likewise very difficult to determine what ignorant people mean by the term "fits;" apoplexy, paralysis, hysteria, and epilepsy, are all "fits" with them, they have no discriminating eye for the different symptoms that denote the different kind of "fits."

The only notice I have seen of *Cotyledon Umbilicus* being used in any of the diseases just named, is in the *Pharmaceutical Journal* for 1849, where Mr. Ince observes, that it has long been a popular remedy in "hysteria."

Anything that alleviates the sufferings of humanity should be hailed with satisfaction, and whether Mr. Salter has taken a leaf from the prescription-book of the village doctress, or not, is of but little consequence, so long as it is useful, but in that case, it is not a new medicine.

A friend suggested to me some time since, that probably there was a difference in the extract made from the "*Cotyledon Umbilicus*" of the southern and western parts of England, and of that made from the plant gathered in more rocky situations, as Wales, &c. I wish I could speak more positively upon this point, but I have had no opportunity of testing it. I can only say that a London manufacturing Chemist saw some made from plants gathered in Worcestershire, and declared it the best he had ever seen. I believe the London market is supplied with *Cotyledon Umbilicus* (or the extract) mostly from Devonshire, Somersetshire, &c.; therefore, whether the difference in the extract was caused by the different habitats of the plant, or by greater care in the preparation, remains a question that can only be solved by absolute practice. From what I am able to judge, the amount of extract yielded by the green leaves gathered about February, varies from four pounds to six pounds in the hundred-weight. This extract is also about the consistence of soft butter.

I pretend to no originality in these remarks, but have brought them forward, thinking they may induce others, who, perhaps, possess greater advantages than myself, to examine the subject of the local uses and names of British plants. There is scarcely a Chemist and Druggist who is not, at some time, made aware of his deficiency on these points, through the application of some person for an article which he, in all probability, possesses, but which he fails to recognize under the name given it by the common people, more particularly if he be a comparative stranger in the locality.

In examining the subject, they might eliminate all that is worthless, and adopt whatever they found worthy of support. In doing this, they will be just as much assisting truth and progress, as if they were engaged in some higher and more ostentatious branch of the sciences.

The PRESIDENT said that in his opinion, whether Mr. Salter was the original discoverer of the virtues of *Cotyledon Umbilicus* in epilepsy, or only the introducer of it into the regular practice of medicine, he was equally entitled to the thanks of the community at large for any benefits that might arise from its use, although, as far as his own experience went he thought that the value of this remedy in epilepsy had been much overrated. The President also stated that he was very glad to find, from the interesting paper just read, that the local uses of our indigenous plants had begun to excite the attention of the Members of the Phytological Club; as this was one of the prominent objects contemplated at its establishment, and one also which he had on several occasions impressed the importance of upon the Members, he hoped therefore that this paper would soon be followed by others on similar subjects. Mr. Bentley also called attention to that part of the paper referring to the probability of the extract of *Cotyledon Umbilicus*, prepared from plants from different habitats, possessing somewhat different characters. He thought that this was very likely to be the case, as he believed that climate, soil, &c., had far more influence in modifying the properties of plants than was generally supposed, and from the importance of the bearing of this subject upon Pharmaceutists, who had continually to make use of plants and their products in the preparation of various

medicinal compounds, he urged the necessity of a thorough investigation of the matter upon the Members of the Club.

Mr. Blyth observed, that the extract of the *Cotyledon Umbilicus* had been largely tried at St. Mary's Hospital, more especially by Dr. Sieveking, and the effects had been so satisfactory, in some cases of epilepsy, in causing a remission of the attack, as to justify its further use. Dr. Sieveking had observed, that its exhibition was followed by long intervals of freedom from fits—intervals that had been regarded by the patients themselves as cures—but which, without exciting extravagant hopes of cure in every case of epilepsy, might lead to the further investigation of what, if properly applied, might prove to be a serviceable preparation—he had distinctly traced its action upon the kidneys—it was manifestly a diuretic. Mr. Blyth, from personal communication with Dr. Sieveking, knew this to be his impression, and he (Mr. Blyth) thought pharmaceutists could not be too careful in the preparation of the extract. He did not know from what part of the country the plant was obtained from which the extract supplied to the Hospital was made—but the extract itself was most unexceptionable. It was the province of the pharmaceutist to prepare a good extract—it was the province of the physician to judge of its effects.

There will be no Meeting of the Phytological Club in the month of April. The next meeting will take place, therefore, on Wednesday, May 10th, at 9 P.M.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

Report of the Scientific Meeting held in Princes Street, Edinburgh, on Friday Evening, the 21st of February.

H. C. BAILDON, ESQ., PRESIDENT, IN THE CHAIR.

[This Report was received too late for publication last month.—Ed.]

The following communications were made:—

1st. "Illustrations of the Value of Microscopic Botany to the Medical Practitioner and Student." By Dr. W. Lander Lindsay, Crichton Royal Institution, Dumfries.—In the unavoidable absence of Dr. Lindsay, Mr. Shaw read this paper to the Meeting, which illustrated the great advantage of microscopical investigation in ascertaining the purity of drugs, more especially those of vegetable origin, and also the importance of bringing the same species of investigation to bear upon many medico-legal cases. Dr. L. condemned those Students who complained of the extensive nature of the curriculum of study assigned to each department of the profession, and referred especially to the fact, that many considered botany as a science the knowledge of which was quite unnecessary for the prosecution of the Medical or Pharmaceutical profession. Dr. L. illustrated the fallacy of such a feeling by two or three cases which had come under his own observation, more especially in reference to adulteration of tobacco, and in a case of poisoning from vegetable matter. The paper was accompanied by a sheet of sketches of the appearance under the microscope of the substances referred to by the doctor in his paper. The communication was listened to with much interest, and a vote of thanks having been proposed by Mr. Mackay to Dr. Lindsay, was carried by acclamation.

2nd. Mr. John Mackay read a few remarks upon the substance used as a substitute for tartaric acid in charging the Gazogene apparatus. After describing the apparatus and showing the manner in which the carbonate of soda was usually decomposed, he stated, that in consequence of the high price of tartaric acid, some parties had resorted to the use of supersulphate of soda, and mixing this with a small portion of tartaric acid, had sold it for the above purpose

under the name of *common tartaric* acid. Mr. M. gave an account of the sources from which this salt was obtained, its commercial history and value, its use in Pharmacy, and chemical composition. He submitted to the Meeting a sample of the substance thus sold, and compared its effects upon carbonate of soda, in presence of the Meeting, with a mixture of supersulphate and acid, which he had himself prepared, and proved the identity of the two from their appearance, taste, and effects of saturation when dissolved and mixed together. He reprehended in strong terms the admixture of such an inferior salt with tartaric acid, to enable the vendor to give such a misnomer to it as that under which it was in some places becoming known.

At the conclusion of the paper the Chairman mentioned that a large trade had been done by using the bisulphate of potash as a substitute for the tartaric acid in the Gazogene, but sold under its proper name, and so far as he had been able to judge, had answered the purpose very well.

The thanks of the Society were unanimously passed to Mr. Mackay for his contribution.

3rd. Several very beautiful specimens of dye woods were then shown to the Meeting, having been presented by John Paynter, Esq., of Glasgow.

4th. Particulars concerning the Register Fund Prize were then read by the Secretary, and the Meeting brought to a close, Mr. Aitken having proposed a vote of thanks to Mr. Baildon for his conduct in the chair, which was seconded by Mr. Shaw, and carried with applause.

LIVERPOOL CHEMISTS' ASSOCIATION.

PHARMACEUTICAL MEETING, 10*th February*, 1854.

MR. T. D. WALKER IN THE CHAIR.

T. C. Archer, Esq., exhibited and described various new Pharmaceutical substances. Mr. Mercer also exhibited several specimens.

On the 3rd March,

Mr. H. S. Evans delivered his third lecture on Histo-pharmacy—"The histology of leaves, senna, savin, tobacco and tea, and their adulterations." He also showed a new kind of sarsaparilla, imported from the west side of Central America. He understood that it was in considerable demand in Russia.

Dr. Edwards showed a photograph of the deposit on a glass vessel from water which had been boiled in it. He thought it illustrated the rotary motion of storms.

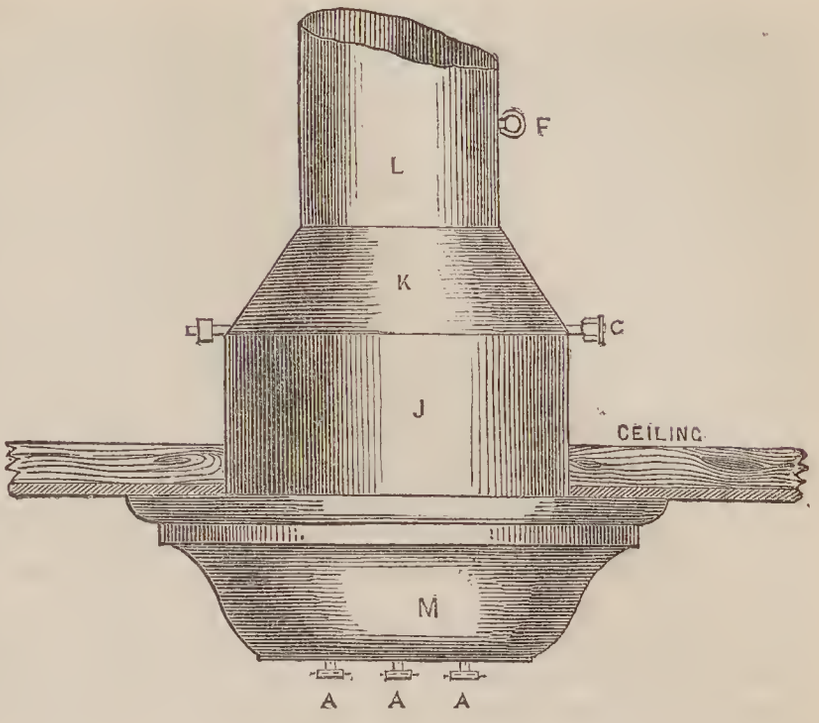
On the Evening of the 10th of March,

MR. RAWLE, THE PRESIDENT, IN THE CHAIR,

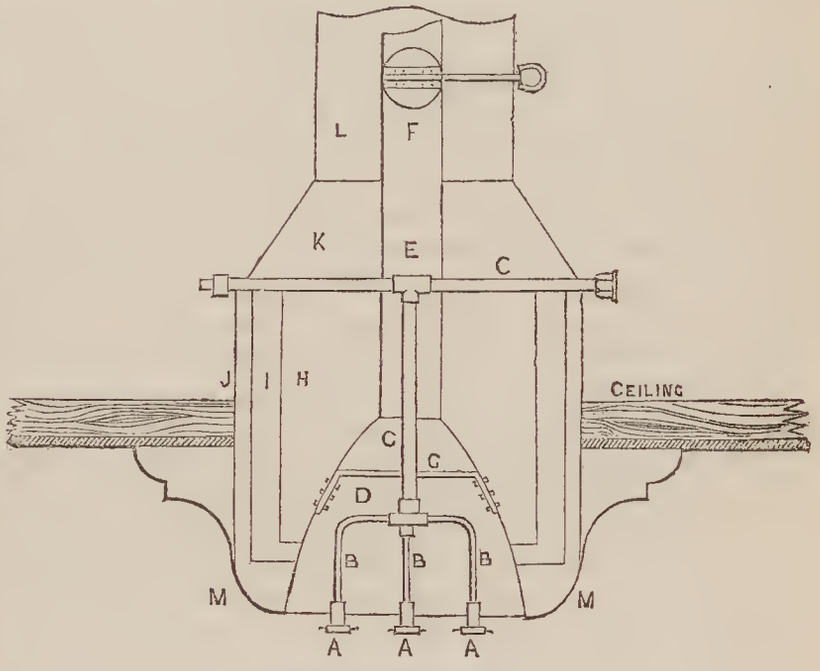
Mr. Thomas Edwards, of the Liverpool United Gas Company, read a very interesting paper on "The *Sunburner*, for Lighting and Ventilating Public Buildings, &c. He commenced his observations by referring to the usual methods of gas illumination, and illustrated his remarks by specimens of all the more important burners in use, including the batwing, fishtail, Cockspur, Argand, Leslie's, Faraday's, &c.

Now (said Mr. Edwards) in the ordinary use of all these burners, with the exception of Faraday's, the products of combustion are allowed to escape into, and mix with the atmosphere of the room; and as the first cost of Faraday's burner is high, the expense of keeping it in order great, the glasses frequently cracking, and the attention it requires more than most persons would be inclined to give, it is not likely to come into very general use. To obviate, therefore, all the objections to gas lighting with chandeliers and brackets, to prevent any portion of the products of combustion mixing with the atmosphere of the apartment lighted, to promote ventilation, and economise light, are the objects I had in view in designing the Sunburner arrangement. Its construction is very simple, as will be seen by a glance at

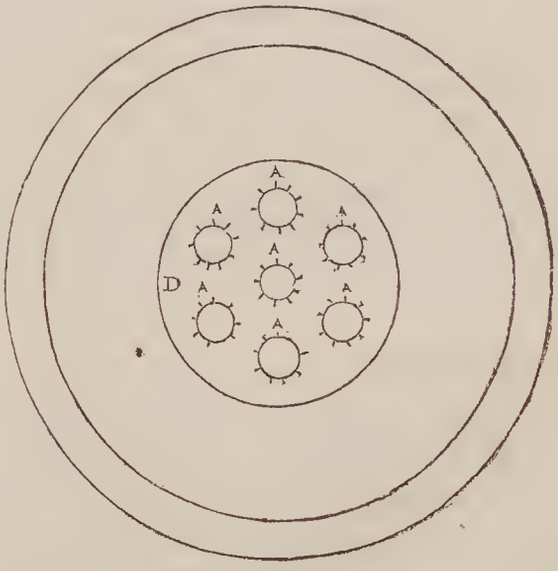
the diagrams. No. 1 is an Elevation, No. 2 a Section, and No. 3 a plan of a 3-light Burner. The parts marked *A* are seven clusters of nine fish-tail burners, each supplied by gas through the pipe *C* and branches *B*. These burners are surrounded by a cone, *D*, to the top of which is attached a tube *E*, passing through the ceiling to carry away the whole of the products of combustion. In this tube is placed a butterfly valve, *F*, for the purpose of regulating the current of air, so that the lights may burn perfectly horizontal. *G* is a strap of flat iron, to keep the tube *C* in the centre of the cone. The parts now described are all that are necessary for lighting, but round the exterior of the cone there are placed three sheet-iron cases, *H*, *I*, and *J*, which, while they aid in ventilating, as will be shortly explained, also prevent the heat being transmitted from the cone to the woodwork of the building, for as may be easily conceived, the heat generated by such a large number of burners confined in so small a space, soon makes the cone red-hot. By referring to diagram No. 2, it will be seen these cylinders are not connected to each other, or to the cone, so that distinct currents of air pass between each of them, one current between *D* and *H*, a second between *H* and *I*, and a third between *I* and *J*; and such is the cooling effect of these currents, that while the cone *D* is red-hot, you can bear your hand upon the cylinder *H*, and the cases *I* and *J* are of the same temperature as the atmosphere of the room. On the upper part of the cylinders, *H* and *I*, is placed the inverted cone, *K*, with its pipe, *L*, to receive the currents passing on each side of *H*. This pipe, *L*, is carried through the roof, and protected by a wind-guard on the outside. From the lower part of *J* to the edge of the cone *D*, is placed the ornamental disc of perforated zinc, *M*.



No. 1.—Elevation.



No. 2.—Section.



No. 3.—Plan.

Such is a description of all the parts of the Sunburner arrangement; and the question will here naturally arise, is it an economical mode of lighting, seeing that the source of light being placed immediately below the ceiling, is so much higher than is usual when chandeliers or brackets are used? To this question a most satisfactory answer can be given; for though it is evident, the greater the distance the source of light is from the parts into which it has to be diffused, the greater the amount of light required, yet, from the gas being consumed in the heated atmosphere of the Sunburner with its red-hot cone, a fishtail, which there consumes 1.4 feet per hour, will consume, when burning in the ordinary way, 3 feet, or upwards of 100 per cent. more per hour, and does not give so much light. This at first sight may appear strange, but if it is borne in mind that we derive light from gas, not by its burning as gas, but from the combustion of the solid particles of carbon in the flame at an elevated temperature, and the higher the temperature the greater the amount of light for the quantity of gas consumed, it will be seen there is good reason why it should burn more economically in the Sunburner than in a chandelier. As a proof of the economy of the Sunburner, the expense of lighting the Philharmonic Hall may be cited as an example. In the Sunburner over the orchestra there are 171 lights, and it burns at a cost of about $7\frac{1}{2}d.$ per hour, while round the cornice there are 942 lights, and they burn at a cost of about 6*s.* per hour; and in this example there is an advantage in favour of the cornice lights, as they burn at a higher temperature than they would if placed in chandeliers. When the temperature of the external air is 55°, the average temperature of the Hall is 66°, and of the ceiling 124°.

The arrangement of the Sunburner causes it to act remarkably well as a ventilator, the currents of air continually passing between the cone and the cylinders, drawing off the vitiated atmosphere of the apartment, which is replaced by openings in the floor; and by having the air-flues beneath the floor of larger area than the total amount of the areas of their openings into the building, draughts are prevented and general diffusion attained. The general idea acted upon in ventilating public buildings is, that if you have openings in the ceiling, and allow the vitiated air to pass between it and the roof, and then through openings in the latter into the external atmosphere, the building is sure to be well ventilated. The very reverse is often the case, as Mr. Edwards illustrated by reference to Great George Street Chapel, where the heated atmosphere passes through a large opening in the ceiling over the chandelier, into the space between the ceiling and the roof, and there coming into contact with the cold slates, it is reduced in temperature, and from its increased specific gravity, rolls down through the side-openings in the ceiling into the chapel again, and directly on to the heads of persons standing in the gallery aisles.

Mr. Edwards was of opinion that windows ought never to be made use of as ventilators, all the air required being admitted through openings in the floor; and from his experience he found that the area of the air-tubes to ventilate a building was in the proportion of three square feet for every 500 persons.

At the conclusion of the paper an interesting discussion took place, and on the motion of Mr. Mercer, a vote of thanks was passed to Mr. Edwards for his very valuable and practically useful communication.

Mr. Mercer then reviewed the March number of the *Pharmaceutical Journal*, and said he thought a very pleasant and instructive hour might be spent, if every month some member would take the lead in a conversational discussion on the current number of the Journal, refer to the most important and interesting of its articles, and, as occasion served, illustrate them by experiments.

The Secretary announced the receipt of a donation to the library of the Society of Mohr and Redwood's *Practical Pharmacy*, from Mr. T. D. Walker.

MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

This Society held its last Meeting for the Session at the Athenæum, on Friday evening, March 10th, 1854. The attendance was numerous.

After the reading of a paper by Mr. Green on "Fermentation and some of its Products," the Report was read by the Secretary.

The thanks of the meeting were cordially given to the Officers of the Society for their services during the past year, and they were requested to continue in

office. Mr. Standring was re-elected as President, Mr. Lynch as Treasurer, Mr. Roberton as Secretary, and Mr. Holyoake as Auditor. A Committee was formed, who should act in conjunction with the officers of the Society in making arrangements for carrying out the operations of the Society during the next Session.

THE SECOND ANNUAL REPORT OF THE MANCHESTER CHEMISTS' CONVERSATIONAL SOCIETY.

In presenting the Second Annual Report of the Chemists' Conversational Society, it will be gratifying to the Members to know that the Society may be considered to be in a progressive state. The primary object for which the Association was organized, viz., the diffusion of scientific and useful information in reference to Chemistry and Pharmacy, having been steadily kept in view, it is with much pleasure the officers of the Society report the steps which have been taken during the past session for the accomplishment of this object.

The monthly evening meetings of the Society have been well sustained. The session was commenced by an introductory lecture by Professor Crace Calvert, on "The Advantage of Chemical Science to Practical Pharmacy," delivered in the Library Hall of the Athenæum. To this lecture the members of the trade generally were invited, and cards of admission were sent to members of the medical profession, several of whom were present on this occasion.

At the succeeding meetings papers were read by Mr. Woolley on "The Commercial Compounds of Chromium;" by Mr. Wilkinson, on "Syrups and Oxymels;" by Mr. Roberton, on "The Chemical Action of Solar Light on some Pharmaceutical Preparations;" by Mr. Kershaw, on "The Chemical Symbols and Equivalents, their Nature and Use;" and this evening we have been favoured with a paper from Mr. Green, on "Fermentation and some of its Products." Discussions have usually followed the reading of the papers, useful information has been elicited, and a general interest has been apparently excited.

The attendance at the meetings, though not on all occasions so numerous as could be wished, has not declined. The difficulty of maintaining an energetic and vigorous association amongst Chemists and Druggists, chiefly for the pursuit of science, is a fact well known to all who have had any experience in such matters. At present, however, we think we have no cause for discouragement, but rather for congratulation and hopeful expectation.

At the commencement of the session it was felt desirable that something should be done for the instruction and improvement of those who occupy the position of Assistants and Apprentices in our establishments.

Professor Calvert generously offered the free use of his Laboratory and apparatus for the convenience of delivering a course of Lectures on Chemistry, and a sub-committee was formed to make arrangements for the execution of this project.

It is with much pleasure we refer to this portion of the Society's transactions.

Professor Calvert, Mr. Ransome, Mr. Roberton, Mr. Woolley, and Mr. Wilkinson, undertook the delivery of a course of twenty lectures. A class of twenty-eight young men was formed. The lectures are given weekly in the Laboratory of the Royal Institution (kindly lent by Mr. Calvert).

The average attendance, which is twenty-three, and the attention which is evidently given by the Students of the class, is considered exceedingly satisfactory. In order to encourage a regularity of attendance, and to stimulate to industry and study, it was proposed to offer a prize for the best notes, and the best answers given on the notes, of these lectures; and the Members of the Society will appreciate the kindness and liberality of their excellent President, when it is stated that he has expressed a desire to be the donor of this prize; and unless a more suitable book should be suggested, he proposes to present

the forthcoming *Life of Dr. Dalton*, by Dr. Charles Henry, which will be published by the Cavendish Society.

From these statements it will be seen that some progress has been made, though still much remains which it is desirable should be accomplished. And it is earnestly hoped, that by the harmonious and vigorous co-operation of all the Members, the operations of the Society will, during the next session, not only be sustained, but in some measure extended.

The number of Members at present in connexion with the Society is thirty-two, and Associates twenty-eight.

The Treasurer announced that the funds of the Society were in a satisfactory state, having a balance of £10 in hand.

ORIGINAL AND EXTRACTED ARTICLES.

GERMAN AND PRUSSIAN PHARMACY.

BY MR. JOSEPH INCE,
Associate of King's College, London.

It has happened, doubtless, to many readers of these lines to have received a long and singularly ill-favoured strip of paper, recognized at once as a German prescription. The first impression that suggested itself probably was, that while the schoolmaster had been abroad, the writing-master had stopped at home; the next feeling, a natural wish to gain some clue to its contents, and to know something of the Pharmacy with which it was connected.

Such a subject, properly treated, would fill a book; but the design of this short notice is limited to details which may prove useful in daily experience.

No one can be acquainted with the restrictions placed on foreign Chemists without indulging in the quiet satisfaction of being an Englishman. The actual arrangement of the shop is under the supervision of the Medical Police. A regular list points out such articles as may be bought, including rectified sulphuric acid, æther, spirit of wine, and morphia; another table indicates a class of drugs to be entirely separate from the rest, such are nitric acid, aqua plumbi, cantharides, and phosphorus, besides several tinctures, herbs, and extracts. While those deemed poisons must be carefully locked up, as, for example, arsenic, strychnia, veratria, and Scheele's acid.

The following extract from the Prussian Pharmacopœia would find but little favour in our eyes:—

"Those chemical preparations for the making of which no instruction is given in the national Pharmacopœia, may be procured from the chemical factories and drug warehouses. The Apothecary is, however, answerable for their being good and pure. All other chemical and pharmaceutical preparations are to be made by the Apothecary himself, according to the writings contained in the National Pharmacopœia, and the latter is not allowed to prepare the same after any other method for pharmaceutical uses."

Such a pleasant arrangement would effectually destroy one-half of the business of a Druggist.

Prescriptions also are subject to a curious rule. When a Physician orders, for internal application, a larger dose of any medicine than that indicated in the Government list, the note of exclamation (!) must be added. This sign omitted, the Chemist may not dispense it without sending to the prescriber, either to add the requisite mark, or alter the prescription. The maximum dose for opium is two grains; acetate of morphia, half a grain; croton oil, one drop. We give the order as it stands:—"Si Medicus medicamentorum fortiorum majorem pro usu interno dosin præscripserit, quam Tabulâ indicatum est, signum (!) addere debet. Quod si neglexerit, Pharmacopolam Medico formulam remittere opportet, ut vel denuo dosin, præscriptam pronuntiet, vel eam mutet. *Et hæc quoque jussu Regis sancita sunt.*" The German comment on this states, that even when no accident has arisen, an omission of this kind is liable to a fine; and when we

consider the peculiar handwriting of our continental friends, it seems desirable "that caution should mark the guarded way."

There are eighteen German and Prussian Pharmacopœias, and two Belgian ones are written on the same plan. The world would not materially suffer were some kind providence to arrange, under one general head, their States, their Coinage, and their Pharmacy. They present the same external appearance, reminding you of Caxton's first attempts in printing, made on blotting-paper. The subjects are alphabetically arranged, and not divided into separate heads. Materia Medica and Chemistry go hand in hand together. This does not seem to create confusion, while it spares the necessity of an index. The scale of temperature is of course the centigrade, and all liquids are indicated by weight, and not by measure. We hasten from these preliminaries to directly practical results, anxious to avoid the condemnation of the Divine, whose discourses produced so small an effect upon his hearers, "being levelled at a particular heretic not then present in the congregation." Ten distinctive formulæ must be noticed, without which foreign dispensing is unintelligible:—

I.

GLOBULI MARTIATI PULVERATI

(Called sometimes Ferro-Kali Tartaricum).

Ferri Limaturæ, 1 part.
Potassæ Bitart., 4 parts.

Make into a paste with water, and let it digest some time, frequently stirring and renewing the water until it turns black, and becomes soluble in water with a dark green tinge. Let it be dried in a hot room, and finally reduced to a rough powder—to be kept in a well-stoppered bottle.

II.

CERATUM CETACEI.

Ceræ Albæ, Cetacei, Ol. Amygdal., āā partes æquales.

III.

LAPIS DIVINUS.

Cupri Sulphat., Potassæ Nitrat., Aluminis, āā ℥ij; fuse and add
Camphoræ, ℥j.

The *Pierre Divine* of the Codex is made with the same proportion of camphor to three ounces of the other ingredients.

IV.

ELÆOSACCHARA.

Sacchari Albi, ℥j.
Ol. Essent., gtt. xxiv.

These are much stronger than the French ones, which are made by adding one drop of any essential oil to one drachm of sugar.

V.

AQUA LAXATIVA VIENNENSIS.

For this celebrated compound there are twenty-nine recognised forms, exclusive of about an equal number of private ones. It is the Essent. Sennæ Comp. of the German and Prussian Pharmacopœias. The original was as follows:—

Sennæ, ℥iij.
Raisins, ℥iss.
Coriandri, ℥ij.
Potassæ Supertart, ℥ss.
Aq. Bullientis, 2½lb.

Macerate one hour, and add Mannæ ℥viij.
Polypody Root, ℥iij. Strain.

It is now generally made according to the Berlin form:—

Fol. Sennæ, ℥ss.
Aquæ Bullientis, ℥iv.

Infuse for half an hour, strain and add
Sodæ Potass. Tart., ℥ss.
Mannæ, ℥vj.

Whilst at Vienna, it may just be mentioned that the French Pâte, or Poudre de Vienne, is Potassa cum Calce, sold in Paris as a powder, and by us in sticks, like Potassa Fusa.

VI.

OLEUM TARTARI PER DELIQUIUM.

Potassæ Subcarb., 1 part.
Aquæ Destillatæ, 2 parts. Filter.

VII.

PULVIS AËROPHORUS.

Sodæ Carbonat., ℥ss.
Acid. Tart., ℥iij.
Sacchari Albi, ℥vij. Mix.

VIII.

SPECIES AROMATICÆ.

Fol. Menthæ,
— Melissæ, āā ℥iv.
Flor. Lavand. ℥ij.
Caryophyllorum, ℥j. ℳ

IX.

SPECIES LAXANTES ST. GERMAIN
(Thea St. Germain).

Foliorum Sennæ Spiritu Vini Extractorum, ℥iv.
Flor. Sambuc., ℥iiss.
Semin. Fœnicul.,
— Anisi, āā ℥x. Mix.
When *dispensed*, add Potassæ Bitart., ℥vj.

To those who have been present at the fête, the name St. Germain will suggest far pleasanter recollections than its scientific tea.

X.

TINCTURA OPII CROCATA
(Laudanum liquidum Sydenhami).

Opii pulv., ℥iv.
Croci, ℥iss.
Caryoph.,
Cort. Cinnam., āā ℥ij.
Vin. Madeiræ (Sherry), ℥xxxviij.

Sincerely hoping that the reader is not fast asleep, which is very likely, let the entrance of a little lady, dangerously attractive, wake him up. She is very nicely dressed, her hair drawn tightly from her forehead by the force of capillary attraction, and in most winning accents she asks for Rusma. A glance discovers that the new customer is a German actress. We know that a French governess, inquiring one day in a shop at Brighton for Pavilion Parade in tones not altogether English, was told by the astonished master, "We don't keep it." To avoid a similar occurrence, we give the present form:—

Slacked lime, 7 parts.
Orpiment, 3 parts. Mix.

It is used as a depilatory, made into a paste with warm water, and so applied—although in some demand, it cannot be recommended, for it often fails.

Two difficulties yet remain, in each of which books of reference cease to be a guide. A little practical experience may help us over both. The first is the constant use in all prescriptions of terms as unintelligible as Coptic. The following paragraph may do something to unravel them:—

Aqua Florum Naphæ, is Aqua Florum Aurantii
Aqua vegeto-mineralis, is Goulard
Chloretum Ammonii depuratum, is Ammoniæ Hydrochloras
Chloretum Hydrargyri, or Mercurius Dulcis, is Calomel
Cinneres clavellati, is Crude Carbonate of Potash

Emplastrum cephalicum, is Emplastrum Opii
Gummi Guttæ, is Gamboge
Limatura Martis præparata, is Iron filings
Naphtha Vitreoli, is Æther Sulphuricus
Oleum Tartari per deliquium, is Liquor Potassæ Carbonatis
Sal Amarum, is Epsom Salt
Sal essentiale Tartari, is Acidum Tartaricum
Sal Tartari, is Potassæ Bicarb. Crystals Pur.
Tartarus boraxatus, is Soluble Cream of Tartar
Tartarus depuratus, is Cream of Tartar
Tartarus tartarisatus, is Potassæ Tartras
Terra foliata Tartari, is Potassæ Acetas
Terra foliata Tartari *crystalisata*, is *Sodæ* Acetas
Tinct. Meconii or Thebaica, is Tinct. Opii
Unguentum de Nihilo, is Unguent. Zinci

So much for names. The term *Mellago* should find an introduction here; it means three parts of an extract dissolved in one part of water. *Mellago Taraxaci* and *Mellago Graminis* are both thus made.

We enter with becoming reverence on our last remarks; nor should we have ventured on the subject, had not Rawlinson and Layard rendered hieroglyphics fashionable.

Voltaire said of the English that they saved half their time by half-pronouncing all their words; abroad they gain the same end by half-writing theirs. It would, therefore, be a great omission to pass over German abbreviations. *In vas. vitr. epist. vitr. claus. serv.* is a common direction, but not a short one; unfolded it is, *in vasis vitreis epistomiis vitreis clausis serva*—put it in a stoppered bottle. *Mitte Herb. Meuth. Pip. pug.* sounds odd, but leads us to the invariable measure for herbs—*Pugillus* a pinch, *Manipulus* a handful, *Fasciculus* an armful.

Liquids are directed to be put *in lagunc.* (languncŭla, a little bottle), *in lagen.* (lagēna, a stone or other phial), in *ollâ fictili*, a pipkin, or, as we find constantly in German prescriptions, *dans un verre bouché à l'éméril*, which of course means also in a stoppered bottle.

A powder is directed in a bracket (*per cribrum setaceum trajeci*), *i. e.*, to be passed through a hair sieve; and in the same way, *a quisquiliis secernendum*, to be rendered pure (*Quisqiliæ*, literally house sweepings, odds and ends). Solid substances are mentioned, *in frust.* (*frustŭla*, a little bit), *in gleb.* (*glēba*, a lump), *in taleol. sciss.* (*i. e., in taleŏlas scissa*, cut up like jujubes), dried *in fundo sartag.* (*in fundo sartāgĭnis* at the bottom of an iron pan, literally frying-pan); *in leb. cupr. polit.*, a phrase the Oxford Commissioners might have a difficulty in making out. This means *in lebēte cupreo polito*, in a bright copper cauldron. *Charta Exploratoria* is test paper. Tinctures are to be finished *ope preli*, by means of a press. Infusions are often ordered to stand *per nyctheměron*, *i. e.*, for twenty-four hours (*νὺξ* a night, *ἡμέρα* a day); and *prunis injecta* is an intimation to throw the substance on live coals, not prunes (*prūna*).

Let us end with the pathetic injunction so often made, *corporibus heterogeneis ni sit inquinatum*—let it not, presumptuous Chemist, be adulterated.

To understand these contractions, habit is of more use than scholarship. German dog-Latin, like De Vere's Sarza, depends on a peculiar bark.

We had thought of giving the formula for a few Rheno-Prussian pills, but we forbear, lest haply the intelligent reader should mistake them for a wholesale order on a herbalist. To all those interested in similar details, the *Dictionary of Materia Medica*, by Mérat and Lens, specially commends itself. The study of continental Pharmacy has now become an essential requisite for the English Chemist. The German is unquestionably the hardest, and if the preceding sketch has at all lightened the difficulty, none will be more gratified than the writer.

31, *Southampton Street, Covent Garden.*

ON THE CINCHONA BARKS OF NEW GRANADA.

BY EZEQUIEL URICOECHEA, OF BOGOTA.

The increasing commerce in the Cinchona barks of New Granada, and a desire to contribute something to the knowledge of them, are my reasons for writing these lines.

Much has been lately said of the Bogotá Cinchona bark (*China Bogotensis*), in which the new base *quinidine* has been found. As the new alkaloid differs from quinine, and was thought to be much inferior to it in medicinal properties, there was a check on the commerce in the Cinchona barks coming from New Granada, all of them passing under the name of *China Bogotensis;* more recently, however, considerable quantities have been exported to England. That the barks which *now* come from that country differ from one another, I hope to show in what follows, for of the *old* cinchona trees from New Granada, it is too well known that there were a great many species, the barks of which were then exported.

Having received by private means, and not through a mercantile house, seven specimens of bark direct from Bogotá, Professor Wiggers, of Göttingen, had the kindness to examine them; and as I have had the opportunity of comparing them with other known specimens in his possession, I entertain no doubt of the correctness of his determination.

In addition to the barks I obtained an ounce of the sulphate of quinine made by Manuel Umaña and Co., in the Tequendama manufactory, regarding a qualitative analysis of which I may be permitted a few lines.

1. *China pseudoregia.* From *Chipaque*, sixteen leagues from Bogotá. There are some seven subordinate barks that come under this name. According to Reichel's analysis it contains per cent.—quinine, 1.01, cinchonine, 0.63, quinic acid, 1.29.

2. *China flava dura.* From *Suaque*, ten leagues from Bogotá. This cinchona contains, according to Pelletier and Caventou, the discoverers of quinine, and to whom we owe the first scientific investigations of these barks, quinate of quinine and of cinchonine.

3. *China Cartagena.* From *Chipaque.* Here we see, that in the same place there are two kinds of bark collected—this and the *pseudoregia;* and probably in the woods trees of very different species grow by each other, so that these specific names taken from localities are worse than none, for they confuse instead of clear up the subject. This Cinchona bark is but a variety of the *China flava dura.*

4. *China Bogotensis.* From *Fusagasugá*, eight leagues from Bogotá. Of the whole number of specimens that I obtained, this is the only one which has been recognized as the Bogotá bark, which has given rise to so many contradictory views with respect to the bases which it contains.

5. *China rubiginosa.* Found ten leagues from Bogotá.

6. *China rubiginosa.* From *El Acerradero*, also ten leagues distant. Having these two specimens, I am able to give the locality of this bark, unti now unknown. We can therefore say with certainty, that it comes from New Granada, and that M. Von Bergen was right when he asserted that this bark was exported thence, although it can also be said that the same species has come from and is produced at Cusco, in Peru.

The chemical constitution has been but little studied: from an imperfect analysis it appears to contain:—according to Franck, in 100 pounds forty-eight to fifty ounces of cinchonine. The large quantity of cinchonine here found is improbable.

7. *China rubiginosa.* From New Granada, exact locality unknown.

Sulphate of Quinine of the Tequendama Manufactory. It is very white,

* Wiggers's *Pharm.*, 3rd ed., 1853, p. 32.

porous, and crystallized in small needles, the planes of which possess a vitreous lustre. By the well known test with ammonia and sulphuric ether, the solution of the salt was so complete, that the very small quantity that remained between the two liquids was only extraneous matter. The ethereal solution was allowed to evaporate, and it left only a residue of amorphous quinine, with no traces of crystals, which well proves the absence of quinidine. By this test then, we have to consider the sulphate of quinine manufactured in New Granada as on a parallel with similar European preparations.

Résumé. We find from what precedes, or at least we have good reason to suppose, that the seeming contradictions which have been published about the Cinchona bark of Bogotá, and of its chemical constitution, are easily accounted for by considering the varieties of bark coming into commerce under the same name from the same district. Secondly, that the barks that are now-a-days exported from New Granada are not all *China Bogotensis*, but are so different from one another, that we must acknowledge that they come from different trees; a few of these barks, those growing in the plateau of Bogotá or its vicinity, I have noticed above. And further, that *because* the barks come from New Granada they should not be underrated, for they contain some of the best sorts. Schäuffele and Bouquet have shown, that some barks obtained by them direct from the exporter Lopez, of New Granada, are as rich in quinine and cinchonine as the *China calisaya vera*, while naturally, others are not so rich and some are poor ones.

Finally, with regard to the composition of the impure sulphate of quinine of New Granada, it must be expected to vary, and much, according to the *different* kinds of bark employed at this or that time of manufacturing. However, the sulphate of quinine, such as given by the manufactory of Tequendama to-day is quite pure; and it is with no small degree of pleasure that I can say, that our country not only produces the source of the renowned *specific*, but the men and the mind to preserve it, and to distribute it to our fellow-creatures.

[The author has added a note quoting the recent researches of M. O. Henry on some Cinchona barks from Ocaña.—Ed. P. J.]

A DEDUCTIVE VIEW OF ELECTRO-METALLIC DEPOSITION.

BY GEORGE GORE, ESQ.

There are various arrangements whereby metals and other substances may be deposited or set free from solutions of their salts by electro-chemical action, from amongst which we will select the following:—

1st. *To deposit by immersion of one metal in one liquid.*—In this process of deposition by simple immersion of the article to receive the deposit in a solution of the metal to be deposited, it is only necessary that the conditions be fulfilled which are set forth in the "inductive" division of this article (see *Pharmaceutical Journal*, July, 1853), viz., to select a solution of the given metal which is capable of conducting electricity, and in which, at some given temperature, the metal or surface to receive the deposit, is in a certain degree, electro-positive to the substance to be deposited, and has a certain greater degree of chemical affinity for the electro-negative or acid elements of the liquid than the metal to be deposited has. These conditions may easily be tested by immersing a piece of the metal to be coated in the solution—if it becomes coated with the metal of the liquid, it is electro-positive to that metal; it may also be tested by immersing similar pieces of each metal in the liquid and connecting them with a galvanometer, which will show by the direction of the current generated, which metal is electro-positive to the other in that liquid. It is further necessary in this, as in each of the following arrangements, in order that the deposited metal may possess the desired state of aggregation,

colour, lustre, &c., to have the various constituents of the liquid mixed in certain proportions, to determine which must be a matter of experiment, because in our present state of knowledge of the subject, no set of rules can be laid down applicable to all cases, the most our present experience indicates is, that none of the constituents of the liquid should be in a completely saturated condition, *i. e.*, there should be a little more water or other solvent than is necessary to dissolve the salt, and a little free acid beyond that which is necessary to neutralize the metal or basic elements of the liquid, and in most cases it is necessary to increase the conducting power of the liquid, by the addition of an analogous alkaline salt to that of the metal in solution; and in those cases where an insoluble metallic salt is rendered soluble by the addition of its analogous alkaline salt, as for instance, cyanide of copper in aqueous cyanide of potassium, it is also necessary to have an excess of alkaline salt beyond what is absolutely required for the solution of the metallic ingredient. All these conditions being fulfilled facilitate the action.

In this arrangement, the surface to receive the deposit forms both anode and cathode—it both dissolves and receives the deposit, some portions of its surface being from various causes, either from impurities or from different states of aggregation, probably from both, in different electrical conditions to other portions, causes molecular currents of electricity to circulate all over the surface of the substance, the positive electricity passing out at all the more positive points into the liquid, and entering from the liquid into the more negative points and depositing the metal upon them, which causes a still higher degree of polarity and increases the action, thus the more positive points of the substance combine with the negative elements of the liquid and are dissolved, and the positive elements or metal of the liquid combines with the more negative points of the substance, and gradually spreads over the surface, until the whole of it, excepting some inconceivably minute points are covered, when the deposition is retarded and stopped. If, however, the acid of the solution is in excess and the process continued further, those minute uncovered spots enlarge and the whole surface becomes covered with dark specks visible to the unassisted eye.

Whether or not by this "wash," "dipping," or "water process," it is possible to deposit a thicker coating, as with the ordinary "battery process," is at present an undecided question. Some experimentalists have stated that by repeated immersions and intervening polishings, they have succeeded in depositing by it to a considerable thickness.

2nd. *To deposit by immersion of two metals in one liquid.*—In this process, two different metals are connected together by a metal wire and immersed simultaneously in a solution of a third metal; for instance, a piece of iron is connected with a piece of zinc and immersed in a dilute solution of protochloride of tin, the zinc dissolves and the iron receives a coating of tin. The conditions of success in this process are similar to those of each of the other arrangements, 1st, that the metal to receive the deposit and the deposited metal must each be electro-negative, in a certain degree, in the liquid to the metal which causes the deposit, and, consequently, have a certain degree of weaker chemical affinity for its electro-negative or acid elements.

In this arrangement, the receiving surface forms the cathode and the surface of the other metal the anode, and the current affinity is caused, in some cases, wholly by the metal of the anode having greater strength of chemical affinity for the electro-negative or acid elements of the liquid than the metal already combined with them has, and in other cases, partly by this, and partly by the cathode having a less strength of affinity for those elements than their associated metal has.

The state of aggregation, colour, lustre, &c., of the deposited metal in this process is, as in all the others intimately dependent;—1st. Upon the chemical composition of the liquid; 2nd. Upon the quantity and intensity of the circu-

lating affinity; 3rd. Upon the electric conductibility of the liquid; and 4th. Upon the relative sizes, distances and positions of the electrodes.

By this process a deposit of any desired thickness may be obtained, but not so readily as by the ordinary "battery process," in consequence of the chemical composition of the liquid being continually altered and affecting the character of the deposit.

3rd. *To deposit by immersion of one metal in two liquids.*—If two different chemical liquids, capable of conducting electricity, the one being a metallic solution and the other non-metallic, are separated by a porous diaphragm, or carefully poured the one above the other and forming distinct liquids, and two pieces of metal of the same kind as that in solution are connected together by a wire and respectively immersed at the same time in the two solutions, that piece in the non-metallic solution will dissolve and the other will receive a deposit of metal; for instance, if a vessel be divided into two parts by a porous diaphragm, and one side be filled with a dilute sulphuric acid and the other with a neutral aqueous solution of sulphate of zinc, and a piece of zinc be bent so that its two ends may be in the two liquids, that end in the dilute acid will dissolve and the other receive a deposit of zinc; or if a tall glass vessel be half-filled with a neutral aqueous solution of nitrate of copper, then a piece of paper be placed on the surface of the liquid and the vessel carefully filled with dilute nitric acid, and a copper rod be immersed the whole length in the two liquids, the upper end of it will dissolve and its lower end become coated with metallic copper.

The same principles which obtained in the former arrangements also hold good here, for in this case also the surface to cause the deposit must be electro-positive in the liquid with which it is in contact to the receiving surface in its liquid, and must in like manner have a stronger affinity for the electro-negative or acid elements of its liquid than the receiving metal has for the like elements of its solution, and thus cause that preponderance of electro-chemical affinity in one direction, which is the essential element of all electrolysis.

In the instances given the zinc and copper respectively possess a greater strength of affinity for the dilute acids than for the neutral metallic solutions; because, in the one case the affinities are not in any degree satisfied, whilst in the other they are completely neutralized.

The current affinity in this arrangement, if allowed to proceed freely and undisturbed, would be strongest at the commencement of the action, and would gradually decrease until there was about an equal proportion of free acid and dissolved metal in each of the two liquids, and then it would cease altogether, because there would be no preponderance of electro-chemical affinity in either direction; but if we could by any simple means transfer the atoms of salt formed at the positive plate to the surface of the negative plate, and the atoms of acid set free at the negative plate to the surface of the positive plate, each as they were formed, we should be in possession of a source of voltaic power without the consumption of metal or acid.

To obtain a good colour and cohesion of deposit in this arrangement requires similar conditions to those of the other processes.

4th. *To deposit by immersion of two metals in two liquids.*—This is the "single-cell process," and the arrangement generally consists of an inner porous vessel containing dilute sulphuric acid and a rod or plate of amalgamated zinc, placed in an outer vessel containing a solution of a metallic salt, the object to receive the deposit being suspended in the outer liquid and connected with the zinc rod by means of a wire.

Its power of action is much greater than that of either of the preceding combinations, because the affinity of zinc for unneutralized aqueous sulphuric acid is very great, whilst the opposing affinity of copper for the acid of a neutral solution of sulphate of copper is very weak, which two circumstances combined cause a greater preponderance of electro-chemical affinity in one direction than in either of the arrangements already described.

It is used extensively for the multiplication of medallions, casts, statuettes, and other works of art in copper, on account of its simplicity and of the rapidity of its action, time being an important element where a great number of articles of moderate value have to be manufactured for commercial purposes.

To obtain good deposits of metal from various solutions by this process, requires attention to the same general rules which regulate the character of the deposits obtained by each of the other processes.

5th. *To deposit by a separate current of electricity conducted through a depositing vessel.*—This is the ordinary battery process, termed thus from a separate voltaic battery being generally used as the source of electric power; it is employed far more extensively than either of the preceding arrangements, and probably more so than all of them added together; it consists in connecting the article to be coated with the negative pole of a voltaic battery or other source of electric power, by means of a wire, and a piece or plate of the metal to be deposited with the positive pole of the battery by another wire, and suspending the article and piece of metal near each other (but not touching) in a suitable solution of the metal to be deposited.

In this arrangement, the anode or dissolving plate being rendered electro-positive by its connection with the positive pole of the battery, combines with the electro-negative or acid elements of the depositing liquid, and dissolves in the solution, at the same time the article to be coated being made electro-negative by its connection with the negative pole of the battery, receives a deposit of the metallic or electro-positive elements of the liquid. Thus in this liquid, as in all other liquids undergoing electrolysis, the negative elements proceed in the direction of the negative electricity, and the positive elements in that of the positive electricity, and by this means, as fast as the metal is removed from the solution by deposition, it is replaced by fresh dissolved metal, and the solution maintained in its original condition.

There are various circumstances which affect the maintenance of chemical composition of the liquid; thus, if the elements of the liquid which dissolve the anode (the anions, acid, or electro-negative elements) have too strong an affinity for the anode or dissolving plate, and act too powerfully upon it, or if they are in excessive proportion, or if the anode is too large for the cathode or receiving surface, or if it is horizontally below the cathode, the proportion of metal in the liquid will tend to increase by working the solution; but if either of these conditions are reversed, the proportion of metal will tend to increase, therefore the chemical composition of the liquid should be correct, each material in its proper proportion, and if lost by evaporation, &c., should be restored, the electrodes should also be of proper sizes, at proper distances, and in proper positions, and all adapted to the quantity and intensity of the current acting upon the solution.

With regard to the chemical composition of the liquid it is to be remarked, 1st. If the water or other solvent is in deficiency, it obstructs the action by impeding the solution of metallic salt formed at the anode. For this reason, water completely saturated with a metallic salt does not conduct so freely as it would if there was a little free water present. If the water is in excess it diminishes the conductibility by diminishing the relative proportion of the best conductor present, namely, the metal; 2nd. An excess of acid or electro-negative elements in the solution causes it to act too strongly upon the anode, and thus increases the proportion of metal in the liquid. A deficiency of acid decreases the conductibility and impedes the solution of the anode by allowing it to become covered with a non-conducting coating. It also causes less metal to be dissolved than is deposited, and thus decreases the proportion of metal in the solution; 3rd. An excess of alkali in an alkaline metallic depositing liquid will often prevent any appearance of deposit, in consequence of the deposited alkali metal combining with the other metal deposited with it, and causing it to redissolve off into the solution as fast as it is deposited. This is especially the case with solutions containing an excess of cyanide of potassium. In the

deposition of an alloy an increase or decrease in the proportion of those elements of the liquid which act most strongly upon either of the metals causes a corresponding increase or decrease in the proportion of that metal dissolved and deposited. Thus, in the highly successful process for depositing brass, recently patented by Messrs. Morriss and Johnson (vide Newton's *London Journal and Repertory of Patent Inventions*, August, 1853), in which a solution is used consisting of the cyanides of copper, zinc, and potassium, with carbonate of ammonia, all dissolved together in water, an increase or decrease in the proportion of cyanide of potassium causes a corresponding increase or decrease in the proportion of copper deposited in the alloy, and an increase or decrease in the proportion of carbonate of ammonia produces a corresponding increase or decrease in the proportion of zinc deposited, the cyanide of potassium acting most powerfully upon the copper of the brass anode, and the carbonate of ammonia acting most strongly upon the zinc of the anode.

The chief requisites of a good depositing solution are: 1st. A capability of holding an abundance of the metal in solution; 2nd. A capability of dissolving the anode freely; 3rd. Superior conducting power; 4th. The current must take the proper path through it, and thus cause it to yield its metal freely; 5th. It must deposit its metal in the proper state of aggregation, of the proper colour, &c.; 6th. It must not act upon or dissolve the substances which receive the deposit, *i. e.* the metal to be deposited must not be electro-negative in it to any of the substances to be coated; and 7th. It must not deteriorate by working, or decompose readily by the action of the atmosphere or of light, or readily evaporate.

In working a liquid the most important requisites are: 1st. Suitable quantity and intensity of the electric current; 2nd. Suitable temperature of the liquid; and 3d. Suitable sizes, distances, and positions of the electrodes.

In all cases of electrolysis or electro-deposition, success depends chiefly in adapting the quantity, intensity, and direction of the current to the nature of the substance to be operated upon, and of the substances to be set free, the rapidity with which we desire the action to proceed, the state of aggregation desired in the deposited substances, and the localities at which we desire them to be evolved.

In a voltaic battery the greater the *quantity* of electro-chemical affinity or action exercised between the electro-negative elements of its exciting liquid and the positive plate, and the less of such affinity exercised between those elements and the negative plate, the greater is the *quantity* of the current; also the greater the *strength* or *intensity* of electro-chemical affinity exercised between the electro-negative elements of the liquid and the positive plate, and the less the *strength* or *intensity* of such affinity exercised between those elements and the negative plate, and the less the resistance to electric conduction offered by its component parts, the greater is the *strength* or *intensity* of the current and its power of decomposing compounds; also the greater the *number* of alternate elements in a compound battery, and the less the resistance offered by its various parts to the passage of the current, the greater is the *intensity* of the current. In a voltaic battery the positive electricity always proceeds from the plate which has the greatest *strength* or *intensity* of electro-chemical affinity for the negative elements of the liquid and the least of such affinity for the electro-positive elements *through the liquid* to the opposite plate; and negative electricity always proceeds in the opposite direction.

In electro-deposition the *intensity* of the current may be regulated: *A.* by alterations in the battery, the intensity is increased—1st, by increasing the number of alternate pairs of plates; 2nd, by increasing the proportion of acid to water in the exciting liquid up to a certain point; 3d, by raising its temperature; 4th, by approximating the plates; and 5th, by stirring the liquid. *B.* by alterations in the depositing vessel, the intensity is increased—1st, by increasing the proportion of the electro-negative elements in the depositing liquid; 2nd, by raising the temperature of the liquid; 3d, by approximating the electrodes;

and 4th, by stirring the liquid. The *quantity* of the current may be regulated: *A.* by alterations in the battery, the quantity is increased—1st, by increasing the amount of surface of the plates in the liquid; and 2d, by all those means which increase the intensity of the current. *B.* by alterations in the depositing vessel, the quantity is increased: 1st. by enlarging the immersed surfaces of the electrodes; and 2nd, by all those circumstances which increase the intensity of the current.

With any conducting liquid the greater the quantity of electricity passing through it in a given time the greater is the quantity of matter decomposed, and with a suitable solution of any given metal, the greater the quantity of the current passing through it the greater is the quantity of metal deposited, and the two actions are in exact proportion to each other, provided no other substance is deposited with it at the same time, and no secondary actions, such as the redissolving of the metal in the liquid, &c., are present, and with suitable solutions of different metals, the proportions of them by weight deposited by the same amount of electricity, are as their atomic weights or chemical-combining proportions; thus the same quantity of electricity which would deposit 32 parts of zinc would deposit 28 parts of iron, 199 parts of gold, &c. Thus, in all cases, the *quantity* of electrolytic action and of deposited metal is determined by the *quantity* of the current, whilst the *quality* of the action and of the deposited metal or substance is determined by the *intensity* or *quality* of the electric force.

With a suitable solution of any given metal, the higher the intensity of the current passing through it the greater is the tendency to an increase of specific gravity, hardness, and cohesion of the deposited metal; large quantity and low intensity of current deposits the metal, as a plentiful black, or nearly black, soft amorphous powder of small specific gravity; large quantity and high intensity deposits as a plentiful, gritty, semi-crystalline, dark-coloured powder of much greater specific gravity; small quantity and high intensity deposits it as hard crystals; small quantity and low intensity deposits it as a sparing black or dark-coloured amorphous powder; moderate quantity and moderate intensity deposits it as reguline cohesive metal, possessed of its ordinary character; moderate quantity and slightly increased intensity deposits it of a slightly hard and elastic character, of strong cohesion and of silky lustre; moderate quantity and slightly decreased intensity deposits it of a somewhat softer, less elastic, and more flexible character, of weaker cohesion, and of less bright metallic appearance; moderate quantity and high intensity deposits it as a sandy semi-crystalline powder; moderate quantity and low intensity deposits it as a soft dark-coloured amorphous powder; moderate intensity and slightly increased quantity deposits it with its ordinary characters, but rather dull in appearance, and slightly soft and weak; moderate intensity and slightly decreased quantity deposits it with its ordinary character, but more bright, harder, and stronger.

Rapidity of deposition depends upon the *quantity* of the current; with a suitable liquid, the larger the quantity of electricity passing through it in a given time, the greater is the quantity of metal or substance deposited in that time, provided the current passes wholly through the metallic part of the solution and no secondary actions interfere; if the metal is being deposited from a solution in either of the conditions mentioned in the preceding paragraph, an increase in the *quantity* of the current then passing, will chiefly affect the *quantity* of deposited metal, increasing it, and but slightly affect the *quality*, that remaining nearly the same, only a little softer and weaker.

The spread of deposit depends chiefly upon the intensity of the current, the higher its intensity, the more rapidly does it spread over a conducting surface, and the greater is its tendency to spread over non-conducting surfaces, in some cases, even clean surfaces of gutta-percha and glass will be spread over by the deposit.

The crystalline deposit is apt to occur when the atoms of metal or substance from any cause pass *slowly* and in *small number* from the liquid to the solid con-

dition, and have, therefore, *time* and *room* to arrange themselves in the crystalline form; it is a result of small quantity combined with high intensity of the current, and is dependent upon the slowness of deposit and the intensity of attraction of the atoms, or upon the quantity and intensity of electricity passing into a given amount of surface in a given time; if the quantity of metal deposited upon a given surface, in a given time, is small in proportion to the amount of surface to receive it, and if the atoms of metal so deposited are attracted very powerfully, the crystalline deposit occurs; with a given current passing and a reguline deposit taking place, if the proportion of acid in the liquid is increased, it produces a crystalline deposit, by diminishing the proportion of metal in the solution, removing the atoms of metal further apart, and increasing the intensity by diminishing the conduction-resistance;—the crystalline deposit is also powerfully affected by the mechanical condition of the receiving surface, being much more apt to occur when it is very rough or covered with minute points. Any of the circumstances mentioned in a preceding paragraph, which will produce high intensity combined with small quantity of the current, will produce the crystalline form of deposit.

The amorphous deposit is the very opposite of the crystalline, and is a result of the opposite conditions; it is produced when the atoms of metal pass *too rapidly* and in *too great number* from the liquid to the solid state, and have, therefore, insufficient *time* or *room* to deposit themselves in the crystalline or even in the reguline condition; it is a result of large quantity combined with low intensity of the current, and is dependent upon the rapidity of deposition, combined with weakness of attraction of the atoms, or upon the quantity and intensity of electricity passing into a given amount of surface in a given time; if the quantity of metal deposited upon a given surface in a given time is large in proportion to the amount of surface to receive it, and if the atoms of metal so deposited are but weakly attracted, the amorphous deposit occurs. Any of the circumstances mentioned in the preceding paragraphs relating to the regulation of the current which will produce large quantity, combined with low intensity of the current, will occasion the amorphous deposit.

The reguline deposit is produced when the quantity of electricity passing is moderate, and adapted to the amount of metal in the solution, together with the intensity being adapted to the degree of resistance in the circuit to be overcome, and is sufficient to cause a moderate degree of attraction of the atoms of metal to the cathode as they are deposited. It is in all cases to be obtained by following the rules contained in preceding paragraphs for regulating the quantity and intensity of the current.

All the intermediate qualities or kinds of deposit, as hard, soft, elastic, flexible, bright, dull, &c., may be produced by adapting the quantity and intensity of the current to the amount of metal in solution, and amount of receiving surface, and to the resistance to be overcome in the manner and under the conditions aforesaid.

When only a thin coating of metal is required, a short period of immersion of the articles will suffice; but if a thicker deposit is required, it must remain in a longer time; and if by so remaining the surface of the deposit should become dull, or the deposit alter in cohesion or colour, the article should be taken out of the solution, washed in clean water, and polished either with flannel and fine white sand or with the ordinary "scratch-brush" machine, and then reimmersed. This may be repeated as often as the surface becomes dull, until the required thickness is obtained.

In depositing upon good conducting surfaces, such as metals, no further preparation of them is necessary than to make them perfectly clean, connect them with the battery by a wire, and suspend them in the solution; if the metallic surface to receive the deposit is electro-positive in the liquid to the metal to be deposited, as for instance, iron to copper in aqueous sulphate of copper, it will of itself, without the assistance of the current from the battery, become coated, according to the principles of the "wash" or "dipping process" already laid

down, and the metal deposited by the battery current upon this first coating will not be so likely to adhere. In such a case, the metal should first receive a thin coating by battery process in a liquid in which it is electro-negative to the deposited metal, as for instance, iron in aqueous double cyanide of copper and potassium, and then be restored to the original solution to have its thickness increased; in depositing upon inferior non-conducting surfaces, as gutta-percha, wax, glass, &c., it is necessary to coat them previously with a thin film of some conducting substance, such as fine black-lead, bronze, &c., either of which may be applied with a fine camel's hair brush, and by connecting them with a battery of several pairs intensity, the deposit may be caused to spread over the whole surface quickly, but if the surface is very large, it is better to make several connections by small copper wires at different parts of the surface, particularly the more hollow parts, with the main conducting wire, and connect it with a battery of still higher intensity.

Birmingham.

ON THE PREPARATION OF LIME-JUICE, ESSENTIAL OIL, &c.

BY P. L. SIMMONDS, ESQ.

I HAVE, from time to time, had inquiries for information from planters and merchants in the colonies on the subject of the commercial value of and demand for lime-juice in the home market, but hitherto the price realized has been so small, that it left no margin of profit for the producer and shipper. This result arose, however, in a great measure, from the state in which it was shipped, being such as to unfit it, without further preparation, for home consumption. The large naval fleet now employed, and the great increase in emigration, has sent up the price for ships' use. Lemon-juice is preserved for the navy by the addition of one-tenth strong spirit, which would equally apply to lime-juice. It is highly important that the juice should be clarified in the colony, and not sent home turbid and thick with mucilage. For the manufacture of citric acid the lime-juice might be left to slight fermentation, which would throw down mucilage and impurities, and the clear juice then saturated with dried chalk until effervescence had ceased. This chalk extract, if dried by a gentle heat, would then be marketable to citric acid manufacturers as citrate of lime, from which the crystals are subsequently obtained. If half the operations were thus performed on the spot the manufacturer would be benefited by a saving of trouble, and the article would be more portable and manageable for shipment to this country. The producer might represent this to some manufacturer of citric acid and contract to supply him stipulated quantities at a fixed price. Calculations of the cost of manufacture which were made a few years ago left no margin of profit; but I think the subject now is more worthy the consideration of planters and colonists in the West Indies, and even on the west coast of Africa, where the fruit is so superabundant and labour cheap. With this view I think I shall be doing them a benefit by calling attention to the subject through the medium of your widely circulated Journal, whence it is sure to be extracted into many of the Colonial newspapers.

In August, 1850, Captain R. J. Nelson, of the *Royal Engineers*, whilst at the Bahamas, took active steps for bringing into profitable use the vast quantities of limes, lemons, &c., wasted in those islands; from which, first, lime and lemon-juice, possibly also that of the Seville orange, shaddock, and forbidden fruit could be obtained; and, secondly, the essential oil of the lime and lemon, and of any other fruit used in the preparation of the acid. It is to the former that attention is now particularly invited—the latter may be regarded as a bye-product which ought not to be wasted. He submitted some very valuable details and estimates to the Governor and several of the most influential merchants of Nassau, with copies of which I have been favoured:—

"Some eighteen years since," says Captain Nelson, "when stationed at Bermuda, I used to feel dissatisfied with the waste of lime-juice, lemon-juice, and that of other fruits containing the same radical principle (citric acid), for want either of a

market or enterprise ; and it then appeared to me, that much might be done by sending the substance in question to England—not as fruit—not as juice—both liable to various and obvious objections—but as *citrate of lime*, which by well-known and simple processes can be freed at home from the lime, leaving pure citric acid as the disposable commodity.

"This was perfectly original as far as I was concerned ; but I have had reason since to believe that the same idea has presented itself to others, though they have not succeeded; chiefly, as it is assumed from the presence of alumina, magnesia, &c., mixed with the carbonate of lime employed in the process—an objection from which the Bermuda and Bahama rock is free, as consisting of fragments of shells and corals composed of this earthy salt in nearly a pure state. I did not, however, commit myself on a practical question by following mere theory, however correct in the abstract, and therefore consulted one of the most able and wealthy operative Chemists in London ; he has gone cordially and kindly into the question ; and as far as the subjoined process and some general advice on entering the market is concerned, what is now offered is based on the information with which he has supplied me.

"Sicilian lime-juice, concentrated to $\frac{1}{4}$ bulk, is now being sold in London at 2*s.* per gallon; last year at 2*s.* 6*d.*

"If we experiment on 100 gallons of raw lemon-juice (equal to 25 concentrated) we may obtain 25 + 2*s.*=50*s.* and no more—unless some peculiar excellence should unexpectedly present itself in our preparation, *e.g.*, its dry form, which admits of its being stored for years, which can hardly be the case with *juice*, however concentrated.

"By the proposed process (judging from such experiments as I have made) the 100 gallons will be so prepared that it can be sent home as a dry substance, occupying a space of about $1\frac{1}{4}$ cubic foot, instead of four required for 25 gallons of concentrated juice. Hereafter this may be much reduced by hydraulic or other suitable pressure.

"The inquiry therefore comes—*Can we purchase, prepare, pack, and deliver* 100 *gallons of raw juice in* $1\frac{1}{4}$ *cubic feet so as to command* 50*s. including profit?*

"To effect this experimentally with 100 gallons we shall require—

JUICE.	
Superintendent	1
Labourers	3
Room, 20×15 fitted with a 30-gallon boiler and convenient shelves and tables	1
Well, pump, &c.	1
Knives, sharp, or tin graters	3
Press (lever, screw, or roller)	1
Bags, calico, strong	6
Cask, new, hogshead	1
" " half-hogshead	2
Gallon or other larger measure	1
Sieve, iron wire	1
Syphon (6 feet of lead pipe)	1
Drying cloths, calico	4
Spare boxes	4
Lemons, *peeled* or *rasped* (20 per pint)	16,000
Limes, ditto	say 29,000

OIL.	
Screw press	1
Earthenware bowls, large	6
Calico, yards	n
Blotting-paper, quires	n
White glass bottles	n

I have received no information respecting the sale of the oil ; but as the external surface of the peel *must* be removed in the process, and is rich in oil, it would be wrong to waste it.

DIRECTIONS TO PREPARE ONE HUNDRED GALLONS OF RAW JUICE AS CITRATE OF LIME.

"Into 100 gallons of well-settled and strained juice *sift* slowly about 70 lbs., more or less, of well-washed fine *quarry* sand, until all effervescence ceases ; let the white earthy-looking sediment settle at the bottom of the cask perfectly, and let any mixed vegetable matters, &c., &c., float on the surface as a scum;—it should be allowed to stand twenty-four hours to effect this.

"Remove the scum and drain off the liquor by a syphon.

"Pour upon the white sediment 100 gallons of boiling water, stir up well, stand, settle, and syphon off the liquor.

"Repeat this operation with boiling water, and twice again with cold water.

"Remove the white sediment (which is now the required citrate of lime) to suitable filters of canvas, horse-hair, coarse calico, &c., &c., &c., made up as bags, which can be submitted to any desirable action of the press.

"Lay the citrate on calico cloths, &c. to dry thoroughly in the sun—as is done with arrow-root, &c.; pack in boxes under such pressure as may be advisable."

Essential Oil.—"As this must be removed before the fruit is pressed, it should be collected by rubbing the fruit on sieve-shaped tin-graters fitting as covers to earthen-pots. These graters should be concave, the swell lying downwards; the holes all round near and towards the edge should be punched upwards, those in the centre downwards, so as to lead the oil running about the surface of the grater into the pot below.

"These fine raspings, and the oil mixed with them, should then be filtered, first through bags under a well-regulated pressure, and then through calico and blotting-paper. It may then accompany the citrate of lime to the drug-broker as *crude* essential oil of lemons, limes, &c., as the case may be.

"*N.B.*—Arrange the press so as to be available for squeezing the fruit, the peel-raspings, and packing the citrate, unless the establishment be one of (now) unlooked-for magnitude. The pressure should never be so severe as to crush the pips—the 'mummy' can be wrung in cloth if not sufficiently drained—it, and all the refuse, will make a suitable manure for the very trees that supplied the fruit.

"In the proposed experiment we should have prepared these 100 gallons in four portions of twenty-five gallons each."

ESTIMATE OF EXPENSES.	£	*s.*	*d.*	£	*s.*	*d.*
Room, putting in order	1	0	0			
Fitting with shelves and fruit stalls connecting with well	5	0	0			
30 gallon boiler (set) and fitted with brass cock	17	10	0			
				23	10	0
Press				6	0	0
Sharp knives, 3 at 1*s.*				0	3	0
Bags, calico, strong, 6 at 1*s.* 6*d.*				0	9	0
Casks, new, 1 hogshead, at $8				1	13	4
Ditto, ditto, half-hogshead, 2 at $5				2	3	4
Gallon measure (wooden)				0	5	0
Sieve, iron wire				0	10	0
Syphon (6 feet of lead pipe) say				0	15	0
Drying cloths, calico, 4 at 5*s.*				1	0	0
Earthenware pots, &c., fitted with tin graters, 3 at 7*s.*				1	1	0
Calico for strainers, blotting paper, &c., say				1	0	0
Boxes for juice and bottles for oil, say				0	10	0
Baskets or boxes (old) for handing fruit				1	0	0
				£39	19	8

Say a credit at the bank of £50, exclusive of expenses of material, superintendence, labour, and fuel.

"On preparing," says Captain Nelson, "the ordinary formulary for estimate, viz. Material for 100 gallons of lime juice, 29,000 limes at $\$\frac{1}{2}$ per 1000, £3 0*s.* 5*d.*

"Superintendence, Labour, Percentage on apparatus, &c. &c.

"We came by the first item at once so near the *highest* price (£3 2*s.* 6*d.*) that could be at all reckoned on, that further procedure was useless; and for the present the project is abandoned.

"Nevertheless, it is well to record the whole transaction, in case such a revolution should take place in the labour market as may admit of fruit being supplied at a sufficiently low rate—scarcely perhaps exceeding 1*s.* per 1000 for limes, instead of 2*s.* 1*d.*"

Since the foregoing calculations were made, a considerable improvement in prices has taken place, and as lime-juice is now retailing in the city at 5*s.* per gallon, the subject is worth further investigation in the Colonies.

5, *Barge Yard, City, March* 13, 1854.

A FEW HINTS AS TO VARIANCE IN DISPENSING.

BY MR. J. E. JENNINGS.

Much correspondence relative to the adulteration of drugs and chemicals having appeared in the *Pharmaceutical Journal*, the *Lancet*, and other medical journals, and many theories as to the source of such adulterations, which have been mostly referred to the wholesale houses, I trust I may be able to offer a few remarks which will tend to remove that opinion. Being an Assistant, and as Assistants generally are rather migratory, I have had occasion to observe, that in different establishments different modes of manipulation of pharmaceutical preparations are prevalent, which leave no room for wonder at the different and frequent complaints of patients, whose delicate palate and watchful eye discern the slightest variation in taste and appearance of their medicine, the similarity of which, in most cases, a general adherence to the Pharmacopœia would ensure. Let me take, for example, the various discrepancies which exist in the strength of the tinctura opii; it is quite correct that in many instances the opium itself is grievously adulterated, but if any person will consider the various modes of manipulating and the difference of strength in the spiritus tenuior employed, the use of either crude or powdered opium, according to the ideas of the operator, all doubts as to the cause of variance will cease. In many cases the crude opium, as received from the wholesale establishment, is weighed by avoirdupois weight, without any allowance for the difference between that and troy weight, or for the moisture in the drug; it is macerated in one part of boiling water for some days, then adding one part of rectified spirit (which constitutes the spiritus tenuior of the old school); it is then left to itself in the antique tincture bottle at the upper shelf of the shop, at the heat of 90° or upwards, to undergo a slight spontaneous evaporation, till a portion required for use is filtered, and the remainder consigned again to its evaporating atmosphere. Nor is this mischief confined to tinctura opii; many other Pharmacopœial preparations come under the same criticism. I will briefly advert to the employment of the concentrated infusions, which in some cases are resorted to as aids to idleness on the part of the dispenser. I mention this not out of disparagement to the concentrated preparations; no doubt, if properly prepared by the process of cold percolation, they form one of the most useful adjuncts to the dispenser and medical practitioner, but the addition of a quantity of spirit must in many cases prevent their employment when the use of fresh ones are indicated, and they can only be justifiably resorted to in cases of urgent necessity. I think one other source of variability should be mentioned, namely, the use of the pulvis extracti colocynthedis comp., species pro pil. rhei. co., &c., &c., without due allowance for the weight of the excipient, in which case, at different establishments and with different dispensers, the medicine prepared will vary probably in aperient properties. Other varying sources, dependent on adulterated drugs and chemicals, have been so ably treated on in your Journal as to require no additional remarks.

Ledbury House, Notting Hill, February 22nd, 1854.

ANNOUNCEMENT OF AN IMPROVED SCIENTIFIC PROCESS FOR MAKING BREAD.

Messrs. Morian, Martin, and Journet (from Paris) appeared before the Directors and Guardians of the Poor of St. Marylebone, on Friday, the 24th ult., to request permission to make a quantity of bread on the premises, for the purpose of showing the efficacy of a new process which they are desirous of introducing into notice. According to their statement, they can increase the quantity fifty per cent.—that is to say, the same quantity of flour usually required for making 100 loaves, will by their process produce 150, each loaf having the same weight, bulk, and quantity of nutritive matter. The additional expense on making a sack of flour into bread is stated to be not more than 2*s.* 6*d.* or 3*s.*, and the difference is said to depend on the mode of preparing the yeast, and in the construction of the oven. Having been permitted to inspect the bakehouse, they stated that they could make a temporary

alteration for their experiment, and they offered to pay for a sack of flour to make it up into bread at their own expense, leaving the bread for trial in the workhouse. They invited the Members of the Board to be present during the operation, with every facility for judging of the merits of the process.

The Board complied with the request, and a Committee was appointed to witness the experiment.

It should be stated that Messrs. Martin and Journet produced before the Board a report favourable to their process, signed by three French Chemists.

However marvellous the announcement may appear, the parties who make the application, having offered to defray all the expenses of the experiment, are entitled to the opportunity of showing what they can do.

THE ADULTERATION OF DRUGS SUPPLIED FOR THE PARISH POOR.

We have received a copy of the *Liverpool Mercury* of March 3rd, containing the following Report of a Committee of the select vestry of Liverpool, respecting the supply of drugs for the use of the poor, by Messrs. Thomas Eyre & Co. :—

"That the result of their said investigation is highly unsatisfactory in several points of view. The drugs in the store from which all the dispensaries are supplied have been very generally found to be exceedingly inferior in quality, and for those articles not contracted for greatly overcharged in price. The quinine, a costly but indispensable medicine, the impurity of which was first detected by Messrs. Shaw and Rawle, has already been shown by Dr. Brett's analysis to contain so much as 30 per cent. of adulteration. Battley's solution,* or that supplied as such, and which the contractors admit should be charged 8*s*., is charged at 20*s*. in their invoices. Leeches, the market price of which is 24*s*. per 100, are charged at 34*s*. per 100; and the enumeration of such disparities might be considerably extended.

"The duty of ascertaining that the drugs, when received from the contractor's, are correct both as to quality, quantity, and price, especially devolves upon Mr. Lingley, and the bills have always been verified by his signature before being submitted to the workhouse committee. These facts, with others which might be mentioned bearing upon the manner in which Mr. Lingley has discharged his duties, impel the joint committee to the conclusion, that the management of the drug department cannot with propriety be any longer confided to Mr. Lingley's hands; but that an efficient and assiduous officer should be appointed to the discharge of duties so much concerning not only the rate-payers but the poor.

"With regard to the contractors, they have admitted to the joint committee the impurity of the quinine and some other of the articles, as also the overcharges made in their accounts, ascribing them to error and inattention on the part of their own servants.

"The joint committee cannot, therefore, bring themselves to any other conclusion than that the supervision of the medicines, from their delivery by the contractors to their ultimate issue to the poor, should be placed in the hands of such vestrymen as are practically acquainted with the subject; that the medical department of the parish should be managed in its entirety by one committee unmixed up with any other business; and that *that* committee, for the reason above stated, should be the medical relief committee as at present constituted."—E. Bradley, Chairman.

POISONING BY NUX VOMICA POWDER IN MISTAKE.

A melancholy instance of poisoning by the administration of Nux Vomica Powder, given by mistake, and exhibiting its deleterious effects upon the system in a well-marked degree, occurred at Netherton, a village about a mile from Dudley, on the 27th of February last. From the evidence adduced at the inquest it appeared that a woman named Prince, aged twenty-six, feeling herself poorly, sent her younger sister, a rather intelligent girl about fifteen years old, to a druggist's shop in the village, for an emetic. The youth in charge of the shop not seeming to understand her request, she repeated it two or three times, at last stating that it was to make a person sick. The boy weighed out half an ounce of a powder, directing her to give *half* of it immediately in warm water, which was accordingly done. In

* In quoting 8*s*. as the price of Battley's solution, the imitation must be referred to, as Mr. Battley's wholesale price is 20*s*.

the course of *ten* minutes Mrs. Prince complained of violent pains about the stomach and chest, and as the girl described, "soon after drew her mouth about, and stretched herself out in all manner of forms, and was stiff." Feeling alarmed, she called in a neighbour, who immediately directed her to take back the remaining part of the powder, and to say that instead of producing sickness, as was intended, it had made her sister extremely ill. Without examining the powder, the boy pronounced it "all right," instructing the girl to take it back again. The spasms continued at intervals, the chest was fixed, and after a recurrence of such symptoms, increasing in degree, and before medical assistance could be procured, in about an hour and a quarter or half after its administration, death took place. The intellect was clear and the woman sensible. J. Fisher, Esq., surgeon of Dudley, made a *post mortem* examination of the body. The body was pale, and the muscles very rigid, presenting no marks of violence. Adhesions of long standing were discovered between the lungs and ribs, and also the lungs and pericardium. The lobe of one lung was inflamed and much congested. There were also other symptoms of disease in various parts of the body, but nothing sufficient to account for so sudden a death. The heart was empty, flaccid, and pale; the brain congested: the stomach was almost natural, presenting but a slight appearance of irritation, and in one part only. The rigidity of the body was very great; if one of the hands were moved the whole body moved with it. No sickness had taken place after the powder was taken, nor had any antidote been administered. The remaining portion of the powder, as well as the stomach and its contents, were given to Mr. Hollier, Chemist, Dudley. From its appearance and taste that gentleman at once pronounced the powder to be nux vomica, which opinion his further examination fully verified. About ʒij of the powdered nux was also discovered in the stomach of the deceased, and in which, by the usual and appropriate tests, strychnia was discovered. In answer to a question from the coroner, Mr. Hollier stated, that there were cases of death recorded from thirty to fifty grains of such substance having been taken, whilst at the same time recoveries had taken place from larger quantities. The coroner, W. Robinson, Esq., remarked in strong terms upon the impropriety of permitting youths of fifteen or sixteen years old to be left in charge of establishments of the nature of a Chemist and Druggist, and which ought only to be confided to the care of well-educated intelligent persons, and expressed his regret that the Legislature had not made a compulsory enactment, requiring that every one, before commencing such a trade, should undergo an examination to prove his fitness and capability for it. He also alluded to the Act lately passed for the prevention of the sale of arsenic, remarking that in his opinion it did not go far enough, but ought to embrace other poisons. He also remarked upon the endeavour of the Chemists generally to elevate their position by improved education, and referred to the Bill about to be introduced into Parliament in regard to the Medical profession, stating that he should forward the depositions to the Home Office, in the hope that the attention of the Legislature would be directed to the prevention of such lamentable occurrences. As regarded the law of the case, there was none to touch it; neither the proprietor of the shop nor the boy were criminally responsible; it was an unfortunate mistake, and as such it must be regarded. The jury after half-an-hour's deliberation, returned a verdict of "Accidental Death," agreeing with the coroner that it was highly censurable to allow so inexperienced a person to vend poisons of any kind, and regretted the insufficiency of the law to punish such cases.

SILVER PLATES FOR MARKING LINEN.

We have received a copy of correspondence between Mr. Culleton, of Long Acre, and Messrs. Clay and Abraham, of Liverpool, of which, for want of space, we give only the substance in a condensed form.

Mr. Culleton, in a letter dated 17th Jan., 1854, offered Messrs. Clay and Abraham the agency for his silver plates, described as "a new method of marking linen, entirely superseding the pen." He stated that he had 4000 agents through England, all Chemists, and that he was advertising extensively. Samples of the silver plates, and cloth marked with specimens of letters, &c., accompanied the letter.

Messrs. Clay and Abraham accepted the agency (Jan. 19th). On the 9th of March, they wrote to say, that a lady to whom they had sold a number of the

plates, had complained that the marking washed out. On examination they had ascertained that the plates were not silver, but base metal. They demanded the exchange of all the plates for silver plates, stating that they would otherwise return the money received for them.

Mr. Culleton (March 10th) replied, that the plates were not sold as silver, but merely electro-plated. That if used properly, they answered quite well. He said the return of the money was out of the question, but his correspondents might decline the agency if they thought proper. Two advertisements from a newspaper, headed "Culleton's Electro-silver Plates," were enclosed, in support of the statement that they were not sold as silver.

Messrs. Clay and Abraham (March 13th) stated that their pattern plate appeared to be silver, that they were all bought as silver, that some of the plates which they had examined were not even coated with silver, that they decomposed the marking-ink, and were unfit for use. They demanded an exchange of the plates, in default of which, they stated that they should send a circular offering to credit their customers with the amount, and would not be liable for the payment of Mr. C.'s account.

Mr. Culleton (March 14th) repeated his statement, that the plates answered, if properly used; that silver plates were no better. He offered to exchange them on the difference being paid, or to engrave them, free of charge, on the silver plates being paid for. In conclusion, he says, "your customer appears to me very fastidious. I never had so much bother about the plates before, and I send away, on the average, 300 per week."

Messrs. Clay and Abraham (March 15th) acknowledged the receipt of the letter, stating that they had not sent out a single plate since they received a printel label, in which "Electro-silver Plates" were referred to.

[As we are told that 4000 Chemists in England are agents for Mr. Culleton's plates, we conclude that many of them are readers of this Journal, and likely to feel interested in the subject.—Ed.]

QUEVENNE'S IRON.

19, *Southampton Row*, *March* 17*th*, 1854.

Dear Sir,—Doubtless both you and your readers have had enough of Pulvis Ferri, and your efforts to enlighten Pharmaceutists must have been a sad failure (which I do not think they have been), if Mr. Heathfield's observations in your February number required any answer from me. It is well known that *metallic* iron when exposed to air and moisture forms the red and not magnetic oxide, and we have yet to learn how microscopically we can determine their chemical nature. Dr. Wilson's observations in your last number, as far as the chemical part is concerned, would also have been unnoticed by me, as any tyro in the art can distinguish *metallic* iron from its oxides without a complex chemical process, which Dr. Wilson states he cannot do; and it is amusing to see how carefully both this gentleman and Mr. Heathfield avoid all mention of the very simple test of the evolution of hydrogen by dilute sulphuric acid. Unfortunately, however, the concluding paragraph of Dr. Wilson's letter *must* have a reply, for in it he accuses me of sending a purposely prepared specimen to Dr. Gregory for analysis, and also of a want of charity. Now, if he had read my reply to Mr. Heathfield, which he comments upon, he must have discovered that when I answered the letter of a valued correspondent, I did not even know who furnished the substituted oxide—much less who had manufactured it—and was bound to give an honest opinion, which has been proved to have been a correct one; and if any chemist in Europe, except Dr. Wilson, doubt this fact, Messrs. Duncan, Flockhart, & Co. can furnish him with the means of examining for himself. With respect to a preparation furnished by ourselves; I beg to state we have never sent a specimen to any Chemist for examination. Dr. Gregory, without my knowledge, very kindly analysed one for his own satisfaction, which he obtained from Messrs. D., F., & Co., being part of their stock supplied by us, and which had been in their possession for several weeks. I hope, therefore, in future, Dr. Wilson will judge me more charitably than to suppose me capable of sending a prepared specimen for analysis by way of advertisement. This, however, it appears, has been done by Mr. Heathfield, as the following letter, which I subjoin for your readers' amusement, will fully prove.

I am, dear Sir, yours very truly,

To Jacob Bell, Esq. T. N. R. Morson.

(Copy.)

35, *George Street*, 2*nd February*, 1854.

Dear Sirs,—Will you be good enough to let me have ℥ij of Morson's Quevenne's Iron, if you have it more recently prepared than the last I had from you. It is for Dr. George Wilson, who has (with a view to publishing on the subject) analysed a specimen of Heathfield's *freshly prepared*, and who has expressed a wish that I would procure for him a *similar* specimen of Morson's, for comparative analysis. A week hence will do, if you expect a fresh supply by that time.

I am, &c.,

James Robertson.

To Messrs. Duncan, Flockhart, & Co.

(Copy.)

February 2, 1854.

Dear Sir,—You will herewith receive ℥ij Morson's Quevenne's Iron obtained from him about the 20th of December last, and until our present stock is exhausted, we will not order any more from him.

We will communicate your wish to Mr. Morson, but do not think he will send a *specimen prepared expressly* for analysis, as that would not settle the point in dispute between him and Mr. Heathfield.

We are, your most obedient Servants.

Duncan, Flock hart, &Co.

To Mr. Robertson, *George Street.*

CHEMICAL SOCIETY,

5, Cavendish Square.

RESOLUTION PASSED AT A MEETING OF COUNCIL, HELD JUNE 20, 1853.

In order to increase the interest of the Meetings of the Society, certain Meetings, not exceeding five in the year, shall, after the transaction of the ordinary business of the Society, be devoted to the delivery of discourses on matters connected with the progress of Chemistry, and which may be illustrated by experiment.

It is not proposed that these discourses shall be published in the Journal; but where new matter, either theoretical or experimental, is contained in them, such matter may, with the consent of the Council, be published in the form of an abstract or paper.

It is proposed, that after the discourse, discussion shall be invited, and in cases in which the matter of the discourse is published in the Journal, explanations and remarks upon it, offered in discussion, may, with the consent of the Council, be appended.

In pursuance of the above Resolution, a discourse was given on March 6th, "On the Liquid Condition of Matter," by Thomas Graham, F.R.S., and the following have been announced :—April 3rd, "On some Points in Agricultural Chemistry," by John Thomas Way, Esq.; May 1st, "On the Quantitative Examination of Solutions of different Varieties of Sugar by Soleil's Saccharometer, and on a new Alcoholometer," by H. Bence Jones, M.D., F.R.S.; June 5th, "On the Technological History of Wood as a Raw Material," by E. Frankland, Ph. D., F.R.S.

ROYAL INSTITUTION.

The Friday Evening Meetings of the Royal Institution, which commenced this season on the 20th of January, have, as usual, been numerously attended, and several interesting subjects have been brought forward by eminent scientific men.

Mr. Faraday, on the first evening, took as the subject of his communication, "*Electric Induction,—associated cases of current and static Effects.*" The object of this communication was to describe and explain certain phenomena which had been observed in working the Electric Telegraph. The wires used by the Electric Telegraph Company are made of copper $\frac{1}{16}$ of an inch in diameter, having a covering of

gutta percha of about $\frac{1}{10}$ of an inch in thickness. These wires are usually in half-mile lengths, which are joined together by twisting and soldering the ends, and then covering the part with gutta percha, so as to ensure the insulation. The batteries employed consist of zinc and copper plates (4×3-inches) immersed in sand moistened with dilute sulphuric acid, and having about 360 pairs arranged for intensity effects. Having provided such a battery, insulated, with one extremity in contact with the earth, and the other end free, and having also provided a hundred miles of the coated wire, immersed in water, the two ends being kept insulated in the air, and a good earth discharge wire being kept ready, for making the necessary communications,—if the free end of the battery be placed in contact with one end of the water-wire and then removed, and afterwards a person touch this end of the water-wire and also touch the earth discharge-wire, he will receive a powerful shock. This shock is rather that of a voltaic than of a Leyden battery; it occupies *time*, and by quick tapping-touches can be divided into numerous small shocks.

If time be allowed to intervene, between the charge and discharge of the wire, the shock will be less; but it is sensible after two, three, four minutes, or even a longer period. These effects are produced equally well with either pole of the battery, or with either end of the wire.

When the same wire, instead of being immersed in water is suspended in dry air, the effects described cannot be produced. There is reason, on principle, to believe that a very minute effect is obtainable under these circumstances, but as compared with that obtained when the wire is immersed in water, the action is as nothing.

These results were ascribed to the influence of induction in the water-wire, the coating of gutta percha with the conducting surface on each side giving to the immersed wire the conditions of a Leyden jar, and the copper wire thus becomes charged statically with the electricity which the pole of the battery connected with it can supply.

It was further shown that this inductive influence modifies the velocity of the current of electricity through wires. Mr. Wheatstone, in 1834, estimated the velocity of a wave of electricity passing through a copper wire at 288,000 miles in a second of time. This, however, must be considered only as the velocity through copper wires suspended in the air. With submerged or subterraneous wires the velocity is greatly lessened. The following estimates have been formed by several experimenters, the observations having been made under different circumstances:—

	Miles per Second.
Wheatstone, in 1834, with copper wire.....	288,000
Walker in America, with Telegraph iron wire.....	18,780
O'Mitchell, ditto ditto.....	28,524
Fizeau and Gonnelle, with copper wire.....	112,680
Ditto ditto iron wire.....	62,600
A. B. C., copper wire, London and Brussels Telegraph.....	2,700
Ditto ditto London and Edinburgh Telegraph...	7,600

On the 27th of January, Mr. Tyndall gave an interesting communication, "*On the Vibration and Tones produced by the contact of Bodies having different Temperatures.*"

In the year 1805, M. Schwartz, an inspector of one of the smelting works of Saxony, placed a cup-shaped mass of hot silver upon a cold anvil, and was surprised to find that musical tones proceeded from the mass. In the autumn of the same year, Professor Gilbert, of Berlin, visited the smelting works and repeated the experiment. He observed, that the sounds were accompanied by a quivering of the hot silver, and that when the vibrations ceased the sound ceased also. Professor Gilbert merely stated the facts, and made no attempt to explain them.

In the year 1829, Mr. Arthur Trevelyan, being engaged in spreading pitch with a hot plastering iron, and once observing that the iron was too hot for his purpose, he laid it slantingly against a block of lead which chanced to be at hand; a shrill note, which he compared to that of the chanter of the small Northumberland pipes, proceeded from the mass, and on nearer inspection he observed that the heated iron was in a state of vibration. He was induced by Dr. Reid, of Edinburgh, to pursue the subject, and the results of his numerous experiments were subsequently printed in the Transactions of the Royal Society of Edinburgh.

On the 1st of April, 1831, these singular sounds and vibrations formed the subject of a Friday evening lecture by Professor Faraday, at the Royal Institution. Professor Faraday expanded and further established the explanation of the sounds

given by Mr. Trevelyan and Sir John Leslie. He referred them to the tapping of the hot mass against the cold one underneath it, the taps being in many cases sufficiently quick to produce a high musical note. The alternate expansion and contraction of the cold mass at the points where the hot rocker descends upon it, he regarded as the sustaining power of the vibrations. The superiority of lead he ascribed to its great expansibility, combined with its feeble power of conduction, which latter prevented the heat from being quickly diffused through the mass.

Professor J. D. Forbes, of Edinburgh, was present at this lecture, and not feeling satisfied with the explanation, undertook the further examination of the subject; his results are described in a highly ingenious paper communicated to the Royal Society of Edinburgh in 1833. He rejects the explanation supported by Professor Faraday, and refers the vibrations to "a new species of mechanical agency in heat,"—a repulsion exercised by the heat itself on passing from a good conductor to a bad one. This conclusion was based upon a number of assumed general laws, which Forbes considered that he had established. If these laws be correct, then indeed a great step has been taken towards a knowledge of the intimate nature of heat itself, and this consideration induced Mr. Tyndall to take up the examination of the subject. The results of this examination tended to confirm the view originally taken by Faraday, and completely to negative the general laws propounded by Professor Forbes.

The subject brought forward on the 3rd of February, was "*The Transmission of Electricity by Flame and Gases*," by Mr. Grove; but our space will not admit of a report of this communication.

BOOKS RECEIVED.

Voyage dans le Nord de la Bolivie, *et dans les Parties voisines du Pérou ou visite au district aurifère de Tipuani.* Par H. A. Weddell, Docteur en Médécine, &c. Paris: P. Bertrand. London: H. Bailliere, 1853.

Cyclopædia of Chemistry, *with its Applications to Mineralogy, Physiology, and the Arts.* By Robert Dundas Thompson, M.D., F.R.S.E., F.C.S., &c., &c. With numerous Illustrations. London and Glasgow: Richard Griffin & Co., Publishers to the University of Glasgow. 8vo, pp. 540. 1854.

The Druggist's General Receipt Book; *comprising a copious Veterinary Formulary, numerous Recipes in Patent and Proprietary Medicines, Druggists' Nostrums, &c., Perfumery and Cosmetics, Beverages, Dietetic Articles and Condiments, Trade Chemicals, &c.; with an Appendix of Useful Tables.* By Henry Beasley. Third edition. London: John Churchill, Princes Street, Soho, 1854.

The title sufficiently explains the nature of this useful little work, the demand for which has called forth a third edition. It has been carefully revised, and about two hundred new formulæ added. We have already had occasion to give a favourable notice of a former edition.

Observations on the Dentition of the Lilliputian Aztecs. By Dr. Robert Reid, Dentist to the Merchant Maiden Hospital, Edinburgh. Reprinted from the *Monthly Journal of Medical Science* for February, 1854.

Reports of the Council and Auditors of the Zoological Society of London, *read at the Annual General Meeting, April* 29, 1853. London: printed by Taylor and Francis, Red Lion Court, Fleet Street, 1853.

Notes of an Excursion from the Banks of the Atrato to the Bay of Cupica, on the Coast of the Pacific, in the year 1827. By Lieut. (now Commander) Charles Friend, R.N. Communicated by Dr. W. Hamilton, R.N., through Captain Barnett, R.N., F.R.G.S. Read before the Royal Geographical Society of London, on the 13th of June, 1853.

Practical Remarks on the Warming, Ventilation, and Humidity of Rooms. By Francis Lloyd. London: George Cox, 18, King Street, Covent Garden, 1854.

Report of the Committee of the Marylebone Literary and Scientific Institution, for the Half-Year terminating 22nd October, 1853. London: printed by W. Davy and Son, 8, Gilbert Street, Oxford Street, 1853.

THE GENERAL INDEX.

In reply to several Correspondents, we beg to state that the proposed Index will not be merely a reprint, but an entirely new Index, containing reference to all the articles in the volumes to which it relates, the names of the authors, the formulæ and other information in the notices to Correspondents, and the subjects referred to in the discussions at the Meetings of the Society.

TO CORRESPONDENTS.

H. W. P. (Islington).—(1.) When Ext. Sarzæ is ordered in a prescription, the solid extract should be used.—(2.) Ceratum Plumbi Compositum.—(3.) When drops are ordered in prescriptions, drops and not minims should be used. In the case of some fluids the difference is 40 or 50 per cent. It is not so with hydrocyanic acid, the drop being nearly equal to the minim.

Abner (Leeds).—Fresenius's *Instruction in Chemical Analysis*, or Noad's *Chemical Manipulation and Analysis.*

W. S. (Spilsby).—Scents may be deprived of colouring matter by distillation or by peat charcoal, but either method may in some cases injure or weaken the perfume.

M. P. S.—Prepared or Liquid Cochineal. ℞ Cochineal, salt of tartar, cream of tartar, and alum of each ʒi.; boil in ʒviij. of water and strain.—(2.) Essence of Musk. ℞ grain musk ʒxiv. triturated in a mortar with an equal quantity of sugar; boiling water Oss. digest until cold, then add of rectified spirit Oviss., carbonate of potash ʒss.; digest, and filter.

M. P. S. (Manchester).—(1.) Incense, see vol. ix., p. 344, 444. It should give off an agreeable odour, with smoke, but without flame.—(2.) Olibanum and benzoin chiefly.

A Member (Brighton).—We cannot answer the first question, as "the enclosed" was not sent.—(2.) Nepenthe is a secret preparation prepared from opium. It is sold by Messrs. Ferris and Score, Bristol.—(3.) *Tinctura arnicæ* Prus. Ph. ℞ arnica flowers ʒiss., spirit of wine ℔j.; digest and filter. It is sometimes made with the leaves; also with the root.

An Enquirer (London).—A master can compel his apprentice to do his duty. It is the duty of the Chemist to furnish medicine on any day of the week, p. r. n.

Mr. Turner alludes to a not unfrequent artifice for pushing the sale of a patent medicine. A person orders it at a number of shops, but never calls for it, leaving it on the hands of the obliging Chemist. Kernott's Cough Syrup and Pills were lately ordered at Mr. Turner's by a stranger, who is supposed to be merely pushing the sale of the article.

Several Correspondents in London, Sheffield, and other places, have written to us on the subject of the Medical Registration Bill. We have in other parts of this Number stated the position and prospects of the Bill, but have not yet received information as to the exact words to be introduced.

A. T. R.—(1 and 2.) Yes, if qualified.—(3.) It will shortly be announced.—(4.) Yes.—(5). A small quantity of chalk or calcined magnesia facilitates the suspension of essential oils in water.

Mr. W. Smith's papers have been received.

Mr. Roberton's paper is deferred until next month.

Chemicus, *J. P.*, and *J. M. S.*, in the next Number.

Errata.—In the Financial Statement, page 403, of our last Number, under the head Expenditure,

	£	s.	d.		£	s.	d.
For Library	41	6	6	*read*	41	6	8
" Lectures	416	7	0	"	416	7	6
" Laboratory Repairs	20	0	1	"	20	0	0
" Balance	555	10	0	"	555	10	1

In page 407, List of Names under Classical Examination, *for* Tuff, *read* Luff.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. XI.—MAY 1st, 1854.

FURTHER REMARKS ON THE PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

On the 19th of April the return to the mandamus was made by the registrar. We have just been informed that the prosecutor has pleaded to the return and given notice of trial.

It is possible, although not very likely, that by the time this number issues from the press, another step in these proceedings may have been taken in the Court of Queen's Bench. Even if this should be the case, the result could not be known in time for publication. It is also possible that some delay may occur, and that before the decision of the question at issue, the Members of the Society may be called upon at the Anniversary Meeting to pronounce their verdict, approving or censuring the conduct of the Council during the past year.

The question to be argued in the Court of Queen's Bench is a legal technicality, and whatever may be the decision, this will not alter the facts of the case, which at the present time are the only data accessible to the Members. It is therefore important that these facts—apart from legal technicalities—should be clearly and concisely stated, in order that a correct opinion may be formed respecting the defensive policy adopted by the Council.

The purposes contemplated by the Charter of the Society were the advancement of Chemistry and Pharmacy, the promotion of an uniform system of education of those who should practise the same, with other objects of minor importance. The above purposes were to be carried into effect by means of a voluntary association, which all Chemists and Druggists then in business were invited to join, on payment of the subscription, and to which future Chemists and Druggists should be eligible on similar terms, but with the additional condition that they should, prior to admission, pass an examination, or furnish other evidence of qualification. It was necessary to exempt the original Members from these latter conditions, because any plan or regulations ignoring the existing vested rights and interests of the general body of Chemists would have met with opposition on the part of the only persons who could carry out such an undertaking for the future benefit of the public, and the improvement of the succeeding race of Chemists.

The Charter was therefore not retrospective in its operation, and recognized as qualified for admission all Chemists and Druggists at that time in business, giving the Council power to admit future members of the trade on examination or certificate of qualification. The power to admit on certificate of qualification, although for several years very sparingly exercised, was advisedly introduced into the Charter, and the new bye-laws made for a temporary purpose, in November, 1852, were founded on that power.

The Pharmacy Act was designed, not to curtail the influence and usefulness of the Society, but (as stated in the preamble) to extend the benefits which have already resulted from the Charter—not to limit the powers already possessed under the Charter, but to grant additional powers. In other words, the Act was intended to promote and assist in the completion of the undertaking which had up to a certain point been successfully carried on under the Charter.

The Pharmacy Bill, as originally framed, provided for the compulsory registration of all persons who should be in business as Chemists and Druggists at the time of the passing of the Act, and who should apply to be registered before a certain date. It also contained the following clause, *which was expunged in Committee*:—

"Except as hereinbefore provided, no person shall be entitled to be registered under this Act unless and until he shall have obtained a certificate of examination, as hereinbefore mentioned from the persons so appointed as aforesaid."

The Committee of the House of Commons to whom the bill was referred, objected to the former of these provisions, on the ground that many of the persons already in business were alleged to be ignorant and incompetent, and that by obliging the Council to place all such persons on the register, a status would be given to the persons whom it was the object of the Act to exclude.

At the same time it was an established fact that many persons in business at that time, some of whom had been in business on their own account prior to the date of the Charter, and others had established themselves subsequently, and who were as well qualified for admission as the original Members, had not joined the Society, and it was admitted to be desirable to "extend the benefits which had already resulted from the Charter." This could only be effected by the admission of those who might be ascertained to be duly qualified, and by the exclusion of those who although nominally Chemists and Druggists had no just pretensions to the title. To compel all persons prior to admission to pass an examination would have been in effect excluding all Chemists in business on their own account at the date of the Act; and such a provision would have been a violation of the principle adopted in the case of all similar Acts of Parliament, which invariably recognize and protect vested interests. If the Act had prohibited unregistered persons from carrying on the business, as originally contemplated, it would have been *necessary* to retain unaltered the clause requiring the registration of all persons in business as Chemists and Druggists at the date of the Act, whether qualified or not. But the Committee of the House of Commons decided that the Act should merely confer a distinctive title and certain privileges on those persons who should be registered as Members of the Society, or Pharmaceutical Chemists, or both, leaving other persons to carry on their business as before, under other titles. Consequently the operation of the Act was confined to those persons who should voluntarily submit to the conditions of registration, and produce such evidence of qualification as the regulations required.

Among these regulations was the following Bye-law; which, with the other existing Bye-laws, was *confirmed by the Act*, until the ensuing Anniversary in May, 1853:—

"All persons who were or had been established on their own account as Chemists and Druggists at or prior to the date of the Charter, namely, the 18th of February, 1843, may, *on being approved by the Council*, be admitted as Members."

The 10th clause of the Act provides for another mode of admission, declaring that persons who have passed the Examination shall be registered as Pharmaceutical Chemists, and that persons so registered shall be eligible for election as Members.

The 5th clause confers the privilege of registration as Pharmaceutical Chemists on all persons who were at that time Members, according to the terms of the Charter. Consequently two modes of proceeding are recognized in the Act:—Under the *old system* persons are first elected as Members, and afterwards registered as Pharmaceutical Chemists; under the *new system* registration as Pharmaceutical Chemists precedes election as Members.

The confirmation of the Bye-laws above quoted sanctions and continues the old system; and as the Act relates to Pharmaceutical Chemists, and to no other persons, it is a necessary consequence that all persons elected as Members are, *de facto*, Pharmaceutical Chemists. The disputed Bye-law is, *in principle*, identical with the one above quoted, but extends the privilege of admission, under the old system, to all persons who were in business on their own account prior to the date of the Act, and who should, before a certain date, produce satisfactory certificates of qualification. It also defines the limit at which the

old system of admission shall cease, and when future Members shall be required to comply with the conditions named in the 10th clause of the Act. It should be observed, that while the 10th clause declares that certain parties shall be eligible for election, it does not prohibit the admission of Members under previously existing regulations which are expressly sanctioned in the clause confirming the old Bye-laws.

If the provision for the compulsory registration of all persons in business at the date of the Act had been retained, the Council would have been enabled at any future time to elect as Members from among the persons so registered such as might apply for admission with satisfactory credentials, and this would have led by degrees to the inclusion of all duly qualified persons in the list of Members as contemplated by the Charter. In that case the clause prohibiting the registration of any other persons unless and until they had passed the examination, would have been proper and necessary. But the removal of the former provision involved the necessity of expunging the prohibitory clause, *which was therefore expunged*, and the Act as passed leaves the Society unfettered by any allusion to the subject. This would have been a serious defect if the second clause had not provided a remedy.

The principles of the Act being laid down in general terms, and the Charter confirmed, save as altered, the Council are empowered by the second clause to make such bye-laws as they may deem proper and necessary for the purposes contemplated by the Charter or by the Act. The Charter enumerates among the classes of persons eligible for election as Members those who should be certified to be duly qualified for admission. This clause is recited in the preamble of the Act, and in the absence of any prohibition, the provision is, as the Council are advised, included among the provisions of the Charter confirmed by the Act. Knowing and recollecting what took place in Committee on this subject, we are enabled to state positively that the alterations in the Bill were made with the above intention—that is to say, the obligation to register *all* Chemists in business at that date, and the prohibition to register any other persons, except on the conditions stated in the 10th clause, were *both removed*, leaving the Council free to regulate these details at their discretion by means of Bye-laws, subject only to the confirmation required by the 2nd clause of the Act.

In giving this common-sense view of the case for the information of the Members, we have not attempted to expound the legal technicalities. It comes within our province to define the purposes contemplated by the Charter and the Act, and to point out the influence of certain regulations in promoting or frustrating these purposes. We are also enabled on personal knowledge to state what were the intentions of the Parliamentary Committee to whom the Bill was referred. These are matters of fact which any person of ordinary intelligence can understand; but the legal construction of an Act of Parliament is the province of the lawyers. It is for them to decide whether the terms of the Act convey the meaning intended, and answer the purposes for which the Act was passed—whether the absence of a *negative* is equivalent to an *affirmative*—whether the removal of a compulsory direction is equivalent to a prohibition—whether the permission to adopt one mode of proceeding supersedes every other, notwithstanding the confirmation of certain existing regulations providing for another mode of effecting the same object—whether the absence of any positive instruction or prohibition with regard to a matter of detail, coupled with the power to make such Bye-laws as may be necessary, places the regulation of such details at the discretion of the persons entrusted with the office of making such Bye-laws, or whether the discretion of the Council, the Members, and the Secretary of State is to be set at nought, and the purposes contemplated by the Charter and the Act lost sight of, on account of the silence of the Act in reference to the matter of detail referred to? By descending into the minute ramifications of special pleading, other questions of a similar nature may be

raised, involving disputes as to the legal definition of the words "may," "must," "can," "empowered," "required," and the like; and in this argument about words, the spirit and intention of the Act may be entirely forgotten. Such disputations come within the especial province of the lawyers; but in the opinion of the legal advisers of the Society, the discretionary power under which the disputed Bye-laws were framed, is conferred by the Charter and the Act upon the Council, subject to the confirmation and approval of the Members and the Secretary of State, which confirmation and approval surely may be considered a sufficient guarantee against the abuse of such power.

From the facts above stated, it is obvious that the Bye-law founded on this opinion was "*necessary for the purposes contemplated by the Charter and the Act*," which would have been in a great measure frustrated by the exclusion of so large a number of persons from the privilege of Membership and registration. This would have conferred a kind of monopoly upon those who happened to be Members at the date of the Act, against which the persons excluded would have had just cause of complaint, as they are acknowledged to be as qualified for admission as the original Members.

The object of the proceedings against the Society being to procure the expulsion of all these parties (comprising nearly a third of the present Members), the Council have considered it to be their imperative duty to resist, by every legal means, an attack so hostile to the interests of the Society and adverse to the purposes for which it was established. The liberal construction of the Act and the Charter adopted by the Council in framing the new Bye-laws was unanimously approved by the Members at a Special General Meeting in London (in August, 1852) and at several other meetings in the country. The Bye-laws were also sanctioned and settled by the legal advisers of the Society, in whom the Council (including the present opponent) had full confidence. The question now to be considered by the Members is, whether the opposition of one Member, which originated in a personal dispute on another subject, ought in any degree to divert the Council from a line of policy so warmly and generally approved by the Members at large as being of the highest importance to the success and prosperity of the Society.

THE APPROACHING ANNIVERSARY.

When a number of persons having a community of interests are united for the purpose of protecting their rights and resisting aggression, there is a feeling analogous to patriotism—an *esprit de corps*—which binds them together, and becomes stronger in proportion to the difficulties to be surmounted. It was this bond of union which laid the foundation of the prosperity of the Pharmaceutical Society, and although the early Councils had a laborious task to perform, and various obstacles to contend with, there was a satisfaction attending their labours which encouraged them to proceed, and was a sufficient reward for their personal sacrifices on behalf of the Society.

The cause in which they were engaged made progress, the opposition to their efforts gradually subsided, the strength and influence of the Society increased as the natural result of the unity which prevailed among the Members, and it was a subject of congratulation at each Annual Meeting that a very trifling outlay had been required for legal expenses.

During the past year, which ought to have been the most prosperous and satisfactory since the establishment of the Society, the year in which the Pharmaceutical Chemists of this country were called upon to prove themselves capable of self-government, the duties of the Council have been more irksome than at any previous period.

With one Member of the Board having his own professional advisers, criticising the proceedings of the Council and raising disputes on legal technicalities, acting

in the double capacity of plaintiff and defendant during deliberations as to the defence of the Society against his attack, the Council have had a task to perform, which if it were to become the rule instead of the exception, would drive every peaceably disposed Member out of office, and convert the Council chamber into a bear garden. We do not dispute the *legal* right of every man, whether a Member of the Council or not, to try in a court of law any question on which he may dissent from his colleagues, and if each Member of the Council should think proper in support of some crotchet, or for the purpose of acquiring notoriety, to retain his solicitor and embark in litigation, each one would have the same right to commence a suit in the Court of Queen's Bench or Chancery, according to his fancy. If this be the mode in which the business of the Society is to be conducted, if every Member of the Council who finds himself in a minority is to avail himself of the licence the law allows, with a view of coercing the majority to bow to his will, the Society must speedily fall a sacrifice to internal dissension.

The Members have now an opportunity of coming forward and expressing their opinion with regard to this line of proceeding, and also with regard to the question involved in the suit now pending.

They have an important duty to perform at the approaching Anniversary. If there be any among them who sympathise with and desire to support the proceedings against the Society and the practice of settling differencs of opinion in the Council by litigation, they have the opportunity of publicly declaring their sentiments and expounding their principles. If the Members advocate the harmonious co-operation of the Council according to the principles laid down in the Charter, which declares that all questions shall be decided by the majority, it is their duty to come forward and support the Council in their endeavours to carry out the resolutions passed unanimously, or nearly so, at previous General Meetings.

The number of Candidates for election on the ensuing Council is thirty-five, which considerably exceeds the number on any previous occasion. Of those who were nominated forty-seven have declined to serve.

We are not surprised at this disinclination to accept office under existing circumstances, and we believe that several Members of the present Council would gladly have retired if they had not felt it to be their duty to place their services at the disposal of the Society until it is extricated from the difficulties of the present crisis. We may remark that on previous occasions the Council have endeavoured to induce fresh Members to become candidates, but a majority of those nominated have generally declined to serve.

THE POSTPONEMENT OF THE MEDICAL REGISTRATION BILL.

In answer to a question by Mr. Crawford, Lord Palmerston stated in the House, that in consequence of the opposition to the Medical Bill, the Government had decided to oppose its further progress. Lord Palmerston also stated that he had under his consideration the draft of a Bill, prepared by the Provincial Medical and Surgical Association.

With regard to this measure, of which we have seen a copy, we have only to observe, that in its present form, it is open to the same objections which we have noticed in the Bill brought in by Mr. Brady. But it also contains various other provisions, which will not expedite its progress. The authors of Medical Bills generally outwit themselves by endeavouring to re-model the profession, the result of which is that they interfere with vested rights and powerful interests, and thus raise up a formidable opposition. In the meantime the Coffinites open new shops.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, April 5th, 1854.

MR. J. T. DAVENPORT, VICE-PRESIDENT, IN THE CHAIR.

The following Donations to the Library and Museum were announced :—

Quarterly Journal of the Chemical Society, No xxv., from the Chemical Society.

The Assurance Magazine and Journal of the Institute of Actuaries, No. xv., from the Institute of Actuaries.

The Literary Gazette, from the Publishers.

Journal of the Society of Arts, from the Society of Arts.

Journal of the Photographic Society, from the Photographic Society.

An ancient Pharmaceutical Pot (date 1660), from Mr. A. Allchin.

Radix Saponaria orientalis and Storax Bark, from Sidney, H. Maltass, Esq., Smyrna.

Brazillian Cinnamon, Bark of Alyxia stellata, and Lobelia decurrens, from Mr. Daniel Hanbury.

Fruit of Ceratonia siliqua.

Seed of Guilandina bonduc, and Kousso (Brayera anthelmintica), from Mr. Keating.

A fine specimen of native Sesquicarbonate of Soda, from the territory of the Nizam, India, presented by the President.

PRESENTATION OF THE COUNCIL MEDAL.

The first of the Council Medals, prepared as a prize to be competed for by the Students in the School of Pharmacy, was presented by the Chairman, to Mr. Alfred Harnett, to whom it was awarded at the Examination in Chemistry and Pharmacy at the conclusion of the last session.

Mr. Redwood stated that this, which was the first of the medals which the Council proposed annually to submit to competition, had been well earned by Mr. Harnett, the values of whose answers at the Examination had nearly equalled the full values attached to the questions.

The following papers were read :—

ON THE ESTIMATION OF ACETIC ACID,

BY MR. C. GREVILLE WILLIAMS.

Before entering into the subject matter of the following paper, an apology is due for bringing before the notice of the Society a process which has previously appeared in print. I am, however, induced to do so from the fact, that notwithstanding my former paper appeared in the *Chemist* and *Journal de Pharmacie*, it appears to have escaped attention ; at least I have drawn that conclusion from observing that Professor Redwood, in his last lecture on Acetic Acid, did not allude to it. This, however, ought rather, perhaps, to have deterred me from the attempt, and would probably have done so, had I not almost every day experience of its accuracy and rapidity of execution. Moreover, several practical points were omitted in the first communication, to which it is desired to call the attention of the Society.

It is well known that the difficulties attending the estimation of acetic acid by ordinary acidimetry are two-fold, the one being its ready volatility, and the other and more troublesome of the two, the remarkable property which it has of modifying the action of reagents upon vegetable colouring matters. If, therefore, we attempt to ascertain its strength by finding the quantity of acid required to neutralize a given weight of carbonated alkali, we have the blue of the litmus converted to a red by the evolved gas, long before the point of saturation is

arrived at, and yet we dare not heat the liquid to expel it, as in an ordinary experiment, or we introduce another and equally serious error, from the escape of the volatile acetic acid.

The idea of using an alkali in its caustic state then naturally presents itself, but on trying the experiment, we find new difficulties, which are so great as to render the results quite unworthy of confidence: in the first place the test-solution can scarcely be kept without changing strength, and even if we always ascertain that point before each set of experiments, we not only have another operation to perform, but the absorbed carbonic acid acts as in the process first alluded to. Besides which caustic soda and potash are unable to effect rapidly and distinctly the change from red to blue in presence of an alkaline acetate.

The specific gravity, as I have shown elsewhere, is worse than useless as a criterion of the strength of acetic acid. On referring to Mohr's table we find the sp. gr. 1.073 does not differ by the addition of even nine per cent. of hydrated acid; and if it be urged that this occurs only at the extremity of the table least used, it is found that a difference of one unit only in the second decimal place is caused by even ten per cent. increase of strength, namely from 29 to 39 per cent. Many other instances to be found in the table show the impossibility of placing any dependence upon it, even for the most common purposes.

One process recommended in some works is certainly ingenious, although unfortunately it is not accurate; it is founded on a supposed identity between the equivalents of carbonate of lime and anhydrous acetic acid. The process was to take a piece of pure dry marble, to weigh, and then immerse it in a quantity less than could effect its solution, of the acid to be examined, until the latter was saturated; the marble was then removed, washed, and dried again, the loss of weight (supposing the equivalents of carbonate of lime and acetic acid to be the same) gave the percentage at once without further calculation, but the equivalent of acetic acid, as will be seen by the diagram is 51, and that of carbonate of lime being only 50, an error of one per cent. was therefore at once introduced.

This difficulty, however, might easily be removed by a simple calculation, but the *chief* source of error is the impossibility of bringing the marble to absolutely the same state of dryness before and after the operation; the porosity of the stone also, causes it to absorb a portion of the acetate of lime formed, which it is excessively difficult entirely to remove. Moreover, the action of acetic acid in the cold upon pieces of marble is so feeble, that a considerable time is required before a result is arrived at.

Vinegar makers have, I am informed, been sometimes in the habit of using a solution of ammonia of known strength for the purpose of estimating the value of their preparations; but, as it involves more sources of error than any of the processes I have alluded to, it will be unnecessary to discuss its merits.

The old excise method of saturating vinegar with lime, and taking the sp. gr. of the solution of acetate of lime formed, is not a process likely to afford a very accurate result, especially in the case of ordinary vinegar, which contains foreign organic matters. It may be mentioned, however, that if we take acetic acid of tolerable purity, and saturate it with lime, the decimal portion of the number expressing its sp. gr. will be doubled, for instance, 1.024 in the acid would become 1.048 when converted into acetate of lime.

The ingenious hint thrown out by Mr. Bastick when Mr. Redwood made his last communication, which was, I believe, to supersaturate the acid with an alkali, and then to bring it back to neutrality with a mineral acid of known strength, I find to be inapplicable in practice, in consequence of the power which the mere presence of soda or potash has of modifying the action of acids or alkalies on litmus, and even to some slight extent upon turmeric.

The process recommended by Prof. Redwood in his communication, which consists in acting upon pure dry carbonate of baryta with the acid to be examined, both of course in weighed quantities, and calculating the strength from the amount dis-

solved, leaves nothing to be desired in point of accuracy, but the reaction being necessarily performed in the cold is sluggish, and this, taken in connexion with the time required to thoroughly wash the remaining carbonate of baryta, and the necessity of heating it, weighing, and then calculating the amount of acid from the quantity dissolved, makes the process a very long one, and although it is true that many estimations may be carried on simultaneously, yet it is impossible to obtain the results for many hours, a serious defect in commercial analyses, where, next to accuracy, rapidity of execution is the most important feature in a process. Nevertheless, the method is very valuable where the above objections do not apply, and, as by dividing the equivalent of acetic acid by that of carbonate of baryta, we obtain a constant by which the loss of weight of the carbonate being multiplied, we obtain the percentage of acetic acid without the necessity of using many figures.

Having occasion very frequently to analyse a considerable number of samples of acetic acid, and great accuracy being indispensable, I was compelled to look about for some new alkaline substance whose acetate should have little or no power of disguising the action of acids on litmus, and so afford a process which should combine correctness with rapidity of execution. While on this track I recollected the assistance which I had obtained in experiments on the estimation of nitrogen in organic compounds, by the use of a solution of saccharate of lime, in Peligot's modification of Will and Varrentrap's process, for saturating the excess of acid remaining in the nitrogen tube after combustion with soda lime, and, on trying the experiment, I found it to succeed to a degree that I had scarcely anticipated, in effect, acetate of lime has not nearly so great a power of modification of the action of acids on litmus as the corresponding salts of potash and soda, and moreover no carbonic acid is liberated during the experiment.

To prepare the test liquid, we simply dissolve lime in a moderately strong solution of white sugar, which, it is well known, has the power of taking up a large quantity of the earth without destroying its alkaline reaction; the solution, when filtered, has its strength ascertained, which is easily done by means of the standard sulphuric acid to be found in all laboratories where these kind of experiments are performed; it is then diluted, say until five divisions of the burette correspond to one grain of acetic acid.

To perform the experiment, we take fifty grains of the sample to be examined, and rinse the vessel in which it was weighed into a small basin, so as to obtain about two ounces of liquid. A few pieces of litmus paper are then thrown in and the test liquid carefully added until the blue of the litmus is restored, of course, stirring the liquid the whole time.

With moderate care the results will not differ, if even a dozen estimations of the acid are made.

It is necessary, at intervals of about a month or five weeks, to compare the lime syrup with the standard sulphuric acid, as it becomes weaker in time, although with extreme slowness. This, however, is only an affair of a few minutes, and therefore does not add to the difficulty of the process.

The following experiments will show the amount of reliance which may be placed in the method. Some lime syrup which had been made six or eight months was examined by a standard acid, 100 divisions of which were equal to 20 grains of carbonate of potash or 14.78 dry acetic acid. 91 divisions of the lime syrup took 100 of this standard acid for neutralization. The 91 divisions were therefore equal to 14.78 dry acetic acid; but in three experiments 50 grains of commercial acetic acid required 94 divisions of the syrup to restore the blue of the litmus, which gives us 30.5 as the percentage of anhydrous acetic acid. In order to verify these estimations I digested 50 grains of the acid with 100 grains of perfectly pure dry carbonate of baryta, the residue well washed and dried weighed 70.3. The difference between this and the original 100 grains, namely, 29.7 multiplied by the constant .5170 gives 15.35, which being doubled, because only 50 grains of acid was worked upon, gives 30.70 per cent., being only a difference of .2 per cent., an error not greater than is found in the very best analyses of mineral acids.

It is only right to admit that the experiments detailed were made with extreme care, to work out the limit of accuracy; but in ordinary rapid work the process may be fully relied on to $\frac{1}{4}$th of a per cent., as has been found by numerous experiments.

The simplicity of the method is such, that any person accustomed to volumetrical analyses may with moderate care obtain equally satisfactory results.

But there is another case in which the presence of acetic acid modifies in a much greater degree the reactions of vegetable colouring matters, namely, in the estimation of the quantity of free alkali in commercial acetate of potash. Chemists are well aware that if a solution of acetate of potash be rendered alkaline, that, nevertheless, acetic acid is evolved on boiling; and moreover, if a strongly acid solution of acetate of potash be evaporated to dryness and fused, the product is invariably found to be alkaline. We never, therefore, obtain any of the fused acetate of potash of commerce neutral, but although a small excess of alkali is unimportant, it is nevertheless necessary to be in a position to ascertain the amount, and this may be done in two ways, namely, by adding a neutral solution of chloride of barium until no further precipitation takes place, and calculating the quantity of carbonate of potash from the carbonate of baryta obtained, or by adding a solution of resin of turmeric in alcohol to a given quantity of the acetate of potash dissolved in water, and adding the standard sulphuric acid until the red tint which the resin has acquired from the alkali becomes pale yellow, after which point the acid must be added by drops and the solution tested by turmeric paper, drying it each time to drive off the carbonic acid, and proceeding in this way until the solution has become incapable of reddening the test paper, the number of divisions of acid used will of course give the required result. The process is easy and rapid, and although sufficiently accurate for all ordinary purposes, a difference of less than half a per cent. between two samples being capable of estimation, proper care being used, it nevertheless does not equal the process I have given for acetic acid, either in the rapidity or delicacy with which the changes are indicated. I may mention that a dozen accurate estimations of acetic acid may be made in an hour by the use of the lime syrups previously alluded to.

ON THE PURIFICATION OF ESSENTIAL OIL OF BITTER ALMONDS.

BY MR. GEORGE WHIPPLE, F.C.S.

The purification of oil of bitter almonds, and the means by which hydrocyanic acid can be most advantageously separated from the crude oil, having recently occupied the attention of Pharmaceutical Chemists, I beg to communicate some of the results of my experience as a drawer of this and other essential oils.

The method recommended by Dr. Maclagan (*Pharmaceutical Journal*, vol. xiii., p. 277) for removing hydrocyanic acid, is not only complex, but fails to render the oil permanently innocuous.—(Vide Pereira's *Materia Medica*, 3rd edit., p. 1776).

Some years ago I thought of obtaining hydrocyanic acid and essential oil of almonds at one and the same time, by receiving the contents of the condensing worm into a solution of nitrate of silver, and subsequently decomposing the resulting cyanide of silver with hydrochloric acid. Since the publication of Dr. Maclagan's paper I have tried this process, and the oil obtained by it was submitted to Dr. Stenhouse for examination, and pronounced by him to be entirely free from hydrocyanic acid. Whether it be innocuous I leave to be decided by others.

When commercial oil of bitter almonds is mixed with solution of nitrate of silver, and the mixture allowed to stand for some time, crystals of cyanide and nitrate of silver are abundantly formed.

Thirty-two parts of the crude essential oil, sp. gr. 1.079, were redistilled, and

received into a solution of nitrate of silver, when an abundant deposit was formed containing cyanide of silver. The oil was collected, added to a second portion of nitrate of silver in solution, and again distilled, yielding six parts of a colourless oil of sp. gr. 1.051, in which no trace of hydrocyanic acid could be detected. This oil retains the flavour of the bitter almond.

In distilling the essential oil from almond cake, three oils differing in density are obtained. The mixture of these oils is opaque, but becomes bright on being filtered. These results, however, are not peculiar to the production of almond oil. Sassafras yields two oils, a stéaroptène and an odourless salt, very like common alum in appearance, but perfectly soluble in the oils from which it is deposited. This stéaroptène is deposited like the crystalline matter in oil of almonds, but so far as my experience has gone, the product from sassafras is always the same, which in the case of the almond I have not found to be so. The largest crystalline deposit from oil of bitter almonds that has come under my notice was of the consistence and colour of honey. This when washed with alcohol afforded the lemon-coloured crystals which were examined by the late Dr. Pereira, and a specimen of which is among the collection of the Pharmaceutical Society. Another remarkable deposit which I obtained from oil of bitter almonds was examined by Dr. Faraday, and said to be either benzoic or amygdalic acid.

Subsequently on using steam for distilling the oil, all the crystalline deposits I have obtained, which have been examined by Dr. Stenhouse and others, have been designated benzoic acid. After this crystalline deposit has been formed it is sometimes dissolved and again re-deposited, in which respect it differs from what occurs in the case of oil of sassafras. I have never found, if the stéaroptène of sassafras is dissolved in the oil from which it was deposited, that it is deposited again, nor have I been able to crystallize it after it has been liquefied.

We know that benzoic acid is instantly and largely dissolved by essential oil of almonds, and again deposited with change of temperature; and I have placed on the table some of the crystalline deposit thus formed. It will be observed that the appearance of the crystals is different from that of the crystals which are formed spontaneously in oil of bitter almonds. The latter appears to me more nearly to resemble the crystalline product obtained from balsam of tolu, which by Thomson and others has been designated benzoic acid, but which has subsequently been shown to consist principally of cinnamic acid. This cinnamic acid is said to be formed by the oxidation of hyduret of cinnamyle, just as benzoic acid is produced from hyduret of benzoyle. I have observed that during the formation of the crystalline deposit in oil of bitter almonds, water is at the same time produced, which floats upon the oil, a fact which supports the opinion of the crystalline matter being benzoic acid.

Although the crude oil of bitter almonds contains a large but variable quantity of hydrocyanic acid, yet the hyduret of benzoyle is found to be insoluble in hydrocyanic acid, at least in the aqueous acid. Whether it be so in the anhydrous acid, as was hinted by Dr. Stenhouse, is an interesting subject for inquiry.

I may here notice the impropriety of employing the water obtained in the distillation of the essential oil of almonds for culinary purposes. The quantity of hydrocyanic acid contained in this water varies very considerably, and the strength of it is sometimes such as to render it highly dangerous. The solution of the essential oil in spirit, called essence of almonds, as commonly sold, is also, as I conceive, unnecessarily strong. It is usually prepared of the strength of one part of oil and seven of spirit. If made in the proportions of three fluid drachms of oil to sixteen fluid ounces of spirit, it would afford a better flavour, and be much safer.

PURIFICATION OF ESSENCE OF ALMONDS.

BY MR. T. B. GROVES.

The case of poisoning by bitter almonds, which occurred some months back in London, has once more directed the attention of Chemists to the means of depriving the oil of its poisonous character.

The pure oil is known to be innocuous, at least as much so as any merely irritating oil can be, and that its poisonous nature is entirely owing to a contamination of prussic acid, which the oil contains in addition to benzoic acid, benzoine, &c. The proportion of prussic acid varies much, some samples containing, as stated by Taylor, twice as much as others, or even more. Turner states it to be 12.6 per cent., others eight or ten, at any rate it may be said to be from four to six times the strength of the acid of the London Pharmacopœia. The oil itself is, I believe, seldom sold without dilution with spirit, except as a scent for pomades, in which case the presence of prussic acid would be of no importance. Instances, however, have occurred, when it has been sold as almond flavouring, although ill adapted for the purpose, and fatal accidents have resulted. The smallest quantity known to have produced fatal effects is stated by Taylor to be seventeen drops; the largest quantity from which the patient recovered thirty minims. The importance, therefore, of purifying it is evident. The usual almond, ratassia or peach kernel flavour, is made by dissolving one part of the oil in seven or nine parts of rectified spirit. I prefer the latter proportion, and the essence is more manageable, and should be mixed in the convenient proportion of one drop of essence to one ounce of liquid to be flavoured. In order to purify the oil, and to do away with the danger attendant on its use in the crude state, it is recommended to distil it from a mixture of proto-chloride of iron, lime, and water. To these ingredients Mr. Redwood adds peroxide of mercury, and states, that without this the whole of the acid is not removed. The mixture cannot be distilled from a glass retort, on account of the violent burnings that would occur—a copper or other metal still is indispensable for the purpose. On account of the troublesome nature of the operation, the loss sustained, and above all, the fact that nine Chemists out of ten do not posses a metal still of the proper dimensions—the oil is rarely purified. These considerations acted forcibly on myself, and induced me to attempt the purification of the essence by means within the reach of all; and I think I have succeeded in doing so. The process is not altogether novel, being a modification of the well known iron-test for prussic acid. It at first mixed with the essence a solution of the proto, and perchlorides of iron, which are both soluble in spirit, then a slight excess of liq. potassæ, and finally sufficient dilute sulphuric acid to neutralize that excess. I found this to separate considerable quantity of Prussian blue, but that it did remove the whole of prussic, although the proportions of the ingredients were varied very many times. I at last prepared three quantities, in the first of which the acid predominated, the second was neutral, the third strongly alkaline. All three were exposed in small flasks in the laboratory window, and agitated occasionally for two days. In the meantime the first had assumed a bright blue, which had increased from the first, and gave promise of complete purification; the second and third were of an olive-green. As therefore the protoxide was just disappearing, and fearful that oxidation would commence, they were rendered neutral by sulphuric acid, and after a short time filtered. The third was the only one found to be quite free from prussic acid, viz., that in which the alkali had been in excess. From my experiments I deduce the following formula.

Make a solution of protochloride of iron by adding an excess of iron wire to the dilute hydrochloric acid of the Pharmacopœia; when the solution has become neutral, add one drachm of it to an ounce of the essence (containing one-tenth by measure of essential oil), and then twenty-five grs. of potass (the commercial potassic fusa answers the purpose) dissolved in one drachm of distilled water.

Shake them well together, and keep the mixture, shaking and opening the vessel occasionally, until it has acquired an olive-brown colour, then neutralize with dilute sulphuric acid, and after a short time filter. About six drachms will come through without attention, and a further quantity by tapping with the finger the funnel containing the filter. Let the filter then be washed with spirit, until the required quantity be obtained. Nearly the whole of the water will be retained on the filter by the *hydrated* oxides and the cyanide.

The cost of the process may therefore be summed as the metallic ingredients and 3iss. of spirit, very trifling, considering the importance of the object. It is very probable that the cost may be still further reduced by diminishing the quantity of iron and potass, but as I have not tried a less quantity, I cannot recommend its adoption. From an ounce of essence thus treated, I obtained, by treating the mass in the filter with hydrochloric acid, ten grains of what appeared to be pure Prussian blue. Considering it is such, and that it does not contain water (although it is stated to contain a small but hitherto unascertained quantity), assuming also that the spec. grav. of the air is the same as that of water (its real gravity is 1.043, as stated in Turner), the oil must have contained 11.77 per cent. of prussic acid; but allowing the decimals for the correction of errors, the essence contained previous to treatment 1.1 per cent. of anhydrous prussic acid, being therefore more than half as strong as the P. L. acid. It has been asserted that the pure oil, hyduret of benzoyle, is more liable to be oxidized to benzoic acid than the crude; if so, it would be advisable to keep it in well-closed vessels. During the process I have not observed anything that would indicate a change, although such, in a small degree, is very possible. I would only add that the essence when carefully treated as described will be obtained without contamination, and rather improved in flavour than otherwise. I trust this or some other equally effectual method may be generally adopted, and the public health no longer jeopardized by the sale for use in flavouring food of that which is a deadly poison.

Mr. Edwards, of Liverpool, thought the subject of the purification of oil of bitter almonds from hydrocyanic acid was one of considerable importance, and that its discussion in the presence of practical and scientific men would be productive of much good. He thought it was not creditable to the state of Pharmacy in this country, that in addition to the variable strength of the hydrocyanic acid of the three British Pharmacopœias, there should be a preparation sold for culinary purposes which was nearly as powerful a poison as the medicinal prussic acid itself. Some persons thought they mitigated the danger resulting from the use of essence of almonds by making it weaker than the usual strength, but he considered it important that it should be of uniform strength, otherwise those who had been accustomed to use the weaker preparation in considerable quantity, on being supplied with the stronger, would by using it as before, incur great danger. This danger could only be entirely obviated by purifying the oil from prussic acid. When the subject was brought under the notice of Pharmaceutical Chemists some years ago by Mr. Grindley, of Chester, who was then a pupil in the School of Pharmacy, a large establishment at Liverpool commenced selling essence, prepared with the purified oil, but this was afterwards relinquished, the public giving a preference to the essence made with the crude oil, the flavour of which was considered to be better. He trusted that the subject would now be thoroughly investigated and put upon a more satisfactory footing. With reference to the difficulty experienced in distilling the esential oil in glass vessels, which was referred to in Mr. Grove's paper, he would mention a very easy method of obviating that difficulty, arising from the bumping of the liquid, which was to coat the inside of the glass vessel with silver. This may be very readily done by putting into the vessel a solution of nitrate of silver rendered slightly alkaline with ammonia, and boiling it for a few minutes with a little honey. The vessel should not be

used for a few days after being thus coated, otherwise the silver would be liable to peel off.

Mr. Greaves stated, that at the request of Mr. Whipple, he had tried the effect of the essential oil purified by the process described in his paper. He administered forty minims to a cat, and more than a fluid drachm to a small dog, and in neither case were the effects different from those which any ordinary essential oil would produce, and from which the animals soon recovered.

Dr. Normandy observed that experiments on the effects of poisons were frequently made with rabbits, but these animals were, from the peculiarity of their organization, quite unsuited for such experiments. These peculiarities sometimes occurred among animals. Thus, it was well known that common parsley was a poison to parrots. The experiments referred to by Mr. Greaves had been judiciously made upon cats and dogs, which animals more nearly represented man in the manner in which they were acted upon by poisons.

Mr. Pedler thought it more important to effect the purification of the oil than the essence of almonds, the latter being so much diluted with spirit as greatly to diminish the danger attending its use.

Dr. Normandy could not assent to the last observation. He thought the essence the more dangerous preparation of the two, from its being more palatable, and therefore more likely to be drank. A case had come under his observation in which a servant, finding a bottle of the essence, which he mistook for noyeau, was instantly killed from tasting it.

Mr. Allchin said, as the difficulty attending the distillation of the oil in glass vessels, for the purpose of purifying it, had been alluded to, he might mention that he had found a very easy means of preventing the bumping of the liquid to consist in adding common salt to the liquid, so as to increase the density of the aqueous part.

Mr. Redwood thought that something still remained to be determined experimentally, before the subject under the notice of the Meeting could be considered to be satisfactorily settled. It was certainly very desirable that oil of bitter almonds and its preparations, which were principally used for flavouring articles of diet, should be rendered innocuous by the separation of the hydrocyanic acid which the crude oil contained, but it was also important, and indeed essential to the successful application of any process of purification, that the product should retain the true almond flavour, and that it should be sufficiently permanent to admit of its being kept for a reasonable time. Some of the processes which had been proposed for the purpose, did not completely remove the hydrocyanic acid, and this would perhaps serve to explain the differences of opinion which had prevailed with reference to the effects of the purified oil. There was reason to believe that the hydrocyanic acid existed in the crude oil partly in a free state, and partly in some state of combination, for after purifying the oil so that Prussian blue was no longer formed in the usual way, if the purified oil was kept for some time, free hydrocyanic acid again appeared. Some of the processes which had been suggested, however, completely removed the whole of the poisonous ingredient, and the oil was then perfectly innocuous, but after being thus purified, it was found to be much more susceptible of oxidation than when in its crude state, indeed, so much so, as greatly to diminish its value as a flavouring substance. The purified essence, after a time, because little else than a solution of benzoic acid, and no wonder, under such circumstances, that the public preferred the preparations they had been accustomed to, which were not so liable to change. He (Mr. R.) considered that the great desideratum at present was to give to the purified oil (the hyduret of benzoyle) a degree of permanence equal to that of the crude or unpurified oil.

NEW PROCESS FOR THE MANUFACTURE OF BREAD.

Mr. Bell directed the attention of the meeting to some samples of bread which were on the table, made by the process of Messrs. Morian, Martin, and Journet, of Paris, alluded to in the last number of the *Pharmaceutical Journal*. The experiments had been made at the St. Marylebone Workhouse, two portions of the same flour having been used, and the one made into bread in the usual way, and the other by the new process. The statement was substantiated in one respect, namely, that the quantity of bread produced was about 50 per cent. more by the new than by the old process. No satisfactory method had been adopted, however, for testing the quality of the two products, and he suspected that the difference was caused chiefly by the bread retaining much more water in the one case than in the other. The chemical examination, of which a report had been laid before the Board of Guardians, had been made with samples two or three weeks old. When fresh, the bread made by the new process was much more moist and spongy than the other.

Mr. Bastick said he had witnessed the process of bread-making at the St. Marylebone workhouse, to which Mr. Bell had referred, and he was by no means satisfied with the manner in which the experiment had been conducted. The experimenters undertook, by their process, to produce an increase of fifty per cent. in the quantity of the bread, and not to make any addition, beyond the usual ingredients, excepting what could be contained in a quart bottle; but those who watched their proceedings observed, that during the preparation of the dough considerable quantities of a semigelatinous substance were from time to time added, besides the sprinklings from a quart bottle, the contents of which they were very anxious to conceal.

Mr. Porrett thought it very probable that some deliquescent salt was used, so as to cause an increased quantity of water to be retained by the bread.

Dr. Cattell had made a great many experiments relating to the manufacture of bread, and he had found that a decoction of Irish moss, or of bran, when added to the flour, would give it the property of taking up and retaining a large quantity of water in addition to that which bread usually contained.

Dr. Normandy regretted that an engagement had prevented him from witnessing the process under discussion, but from a report left with him, it appeared that the bread to which it referred was not examined until twelve days after it had been made. This was evidently a very unfair method of proceeding, as no idea could be thus formed of the amount of water originally contained in it. He moreover observed, that the report stated that sulphate of copper and other deleterious substances were not contained in the bread, but no allusion was made to alum, which substance he believed was universally added to bread. He deprecated the use of chemicals in articles of food generally, but he had not now so strong an objection as he formerly had to the moderate use of alum in the manufacture of bread. He recollected that some time ago a method was suggested in France for increasing the quantity of bread produced from a given quantity of flour, which consisted in the addition of dried beet-root, which had the property of causing the absorption of an enormous quantity of water. He thought that in the process now under notice, some such substance was most likely added.

The Chairman having mentioned that all the papers had not been read, and the time for terminating the meeting having arrived, it was suggested that a meeting might be held on the third of May, for the purpose of concluding the business. To this the meeting assented, and it was understood that the Library and Museum Committee would make the needful arrangements for the extra meeting at the time proposed.

MEETING OF THE COUNCIL.

5th of April, 1854.

Resolved, That a Conversazione be held on the evening of Wednesday, the 17th of May next, at Eight o'clock.

Resolved, That the Thirteenth Annual General Meeting of the Society be held at No. 17, Bloomsbury Square, on the 18th day of May next, at Twelve o'clock at noon, precisely,

Resolved, That a Special General Meeting of the Society be held at No. 17, Bloomsbury Square, London, on the 18th day of May next, at the adjournment of the General Annual Meeting, to confirm the following alteration made in the Bye-laws of the Society, section I., clause 7, namely: the *erasure* of the word "July," and the *substitution* of the word "December," in its place.

Resolved, That all Members having passed the Major Examination, and having paid the fees as Life Members, shall be entitled to have their Diplomas stamped with the Great Seal of the Society.

LIBRARY AND MUSEUM COMMITTEE.

13*th of April*, 1854.

Resolved, That a Pharmaceutical Meeting be held on Wednesday, the 3rd of May, for the purpose of reading the papers left at the last Meeting, and others subsequently received.

PROVINCIAL TRANSACTIONS.

NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

The last scientific meeting of the North British Branch of the above Society for the present session was held on Monday evening, 17th current, at nine o'clock, in the rooms, 72, Princes Street, J. F. Macfarlan, Esq., in the chair. There was a numerous attendance of Members and Associates.

The Chairman announced the result of the competition for the Register Fund Prize, and stated that the essay having the motto *Omega* was the one unanimously selected as the best. The envelope bearing the above motto on being opened revealed the name of David S. Kemp, who was thereupon requested to read his essay to the meeting. The subject was "The General Properties and Characters of the Vegetable Alkalies." When read, the Chairman complimented Mr. Kemp in very high terms, and proceeded to bestow the prize, which consisted of a handsome medal of polished silver, encircled by a wreath of Scotch thistles in frosted work of the same metal; in the centre of one of the sides was engraved the Pharmaceutical arms, and on the reverse an inscription, with the name of the successful essayist. Mr. Kemp received the prize amidst the loud acclamation of the meeting.

A new and mathematically correct scale balance of Poolley's patent was then shown by Mr. Mackay, the peculiarity of which was, that in whatever position on the scale or plate the load was placed, its weight was indicated with perfect and uniform accuracy.

Mr. G. Blanshard then introduced Nixey's Revolving Till, by which base coin is instantly detected without the trouble of weighing, and the moneys received from the last five customers always retained in view, in a separate and distinct form, and is thus as satisfactory in elucidating error as it is effective in detecting fraud.

In bringing the session to a close, the Chairman gave a concluding address, in which he shortly stated what had been done by the Society during the past year, and referred more especially to those gentlemen who had contributed papers to the

scientific meetings. He also glanced at the number which had been admitted as Members, and congratulated the Society upon its prosperous position.

The meeting then adjourned.

ANNUAL MEETING.

The Annual Meeting of the North British Branch of the Society was held in 72, Princes Street, on Wednesday the 19th, at noon. There was a good attendance of Members belonging to the town, and several from the country were present—J. F. Macfarlan, Esq., occupied the Chair.

ANNUAL REPORT.

The Council in bringing before the Meeting the following Report, cannot refrain from expressing their regret that so much annoyance has been created by the proceedings of one or two Members of the Society in London, whose systematic hostility has been the means of interfering to some extent with the harmonious operation of the Association. Actions at law having been commenced, it remains to be seen whether the enemies of the Pharmaceutical Society will be successful in their endeavours to cause confusion, delay, and discomfort among those whose sole object has been, and continues to be, the advancement of the true interests of the Chemists and Druggists in Great Britain.

During the by-gone session, there have been three scientific meetings held in Edinburgh, and while the Council cannot but regret that these have not been more numerous, they look forward with some degree of certainty from the promises of Members and friends, to their greater frequency during the next session of 1854—55.

The Examinations have been four in number, and though the Council was quite prepared under existing circumstances, to find comparatively few candidates for admission, yet the Examiners have been highly pleased with the knowledge possessed by those who have been examined and admitted into the Society during the past year. The numbers admitted by the Board during 1853, are, Major Examination, 20; Minor Examination, 9 ; and Apprentices 2; in all 31.

In accordance with a previous arrangement, the Library of the North British Branch of the Pharmaceutical Society has been kept open every Thursday evening throughout the session, for lending out and receiving back books. The Council feel that although the number of volumes is as yet limited, full advantage has not been taken of the opportunity given to Members, Associates, and Apprentices, of reading the works now upon the shelves of the Library. The number of works amount to forty, and comprehend fifty volumes; books lent out and returned during the session, are fully 100. The Council consider this trifling demand to be mainly owing to the existing rules and regulations by which the affairs of the Library are managed, some of which have been considered too stringent. These will be re-considered and altered. The Society, as will be seen from the above statement, is not yet in a position to give out books to parties who reside at a distance from Edinburgh, but the Council feel anxious as soon as the stock of publications will warrant such a proceeding, to extend to those in the country the same advantages as are at present derived from this department by all connected with the Society in Edinburgh. The Council feel that the thanks of the Society are especially due to those gentlemen who have so kindly undertaken the duties of superintending the working of this part of the Society.

A few interesting and valuable additions have been made to the Museum during the last year, and when the funds of the Branch will permit, steps will be taken to add more attractive show cases, in order that such specimens as the Howard Collection of Barks may be seen to great advantage.

The Council think it right to notice that much good may be expected to result from the meetings which have systematically taken place during the winter months among the Associates and others for mutual improvement, and they anticipate ultimately considerable advantage both to the Society generally, and the young men individually, from such a course of training as that which has been commenced, and so successfully carried on this session, and recommend that every facility consistent with the other arrangements of the Society be given for furthering the objects of the *Pharmaceutical Improvement Association.*

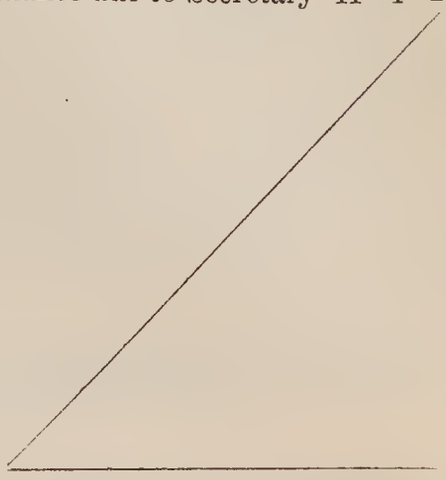
The following is a statement of Receipts and Disbursements from 1st January to 31st December, 1853 :—

North British Branch of the Pharmaceutical Society in account with the Secretary.

Dr. *Cr.*

No. of Voucher.		£	s.	d.
1, 13, & 14.	Various Taxes	2	8	0
2, & 11.	Rent of Rooms	21	6	0
3.	Gas Fittings	3	14	0
4, 9, & 15.	Advertising Meetings, &c.	2	3	0
5, & 18.	Printer's Account	6	1	0
6, 8, & 10.	Show Jars, &c., for Museum	3	1	7
7, & 16.	Gas Account	0	2	0
12.	Various Books for Library	10	4	8
17.	Forms for Meeting	4	11	6
19.	Gas Fitter	0	1	9
	Income Tax	0	7	0
	Porterage, connected with Meeting, Delivery of Bills, &c. &c.	1	1	0
	Coals	0	6	3
	Various Postages	3	13	5
	Paper, Envelopes, &c.	0	15	9
	Cleaning Rooms for 1853	0	12	3
	Dr. Christison's Dispensatory	0	15	0
		£61	4	2
1853.—Dec. 31.	Balance due to Secretary	11	4	2

		£	s.	d.
June 1.	Cash from London	50	0	0
Dec. 31.	Balance due to Secretary	11	4	2
		£61	4	2



We, the undersigned, have examined the above accounts, with vouchers attached, and find it correctly stated, and that the balance due to the Secretary is the sum of eleven pounds four shillings and twopence.

H. C. Baildon,
Willm. Aitken,
Wm. Flockhart.

Edinburgh, 15th April, 1854.

An Annual Prize has this year been instituted from the funds of a register kept by the Secretary for vacant situations among Chemists. This is open to competition to all Associates and Apprentices residing in Scotland, and has on the present occasion been very fairly contested. The Council hope that the presentation of the Silver Medal may act as a stimulus for the future to many connected with the Society, and induce a greater amount of zeal and industry in the study of Chemistry, Botany, and Materia Medica.

The Council, in concluding the foregoing Report, trust that the Council in London will aid the North British Branch of the Society as far as they can by a liberal grant for the current year, in order that the extent and usefulness of the Library and Museum may be increased. The Council also feel desirous that something should be done next session in reference to additional opportunities for Pharmaceutical studies, and in event of being placed in a more favourable position with the means, they hope to be able to do some good towards increasing education among the juniors of the Society residing in Edinburgh and neighbourhood.

Edinburgh, 14th April, 1854.

Mr. Robertson moved the adoption of the Report, remarking upon the prosperous condition of the Branch Society.

This was seconded by Mr. Anderson, Musselburgh, and unanimously agreed to.

The Chairman proposed that H. C. Baildon, Esq., be elected President, and James Gardner, Esq., Vice-President for the next year.

Mr. Bremner seconded this, which was carried by acclamation.

Mr. Murdoch, of Falkirk, proposed the following gentlemen as Councillors for the ensuing year:—Messrs. Macfarlan; Williamson, of Aberdeen; Greig and Templeton, of Glasgow; Finlayson, of Leith; Shaw, Ainslie, Flockhart, Aitken, Young, Bremner, G. Blanshard, Mackay, President and Vice-President of the Branch Society. This was seconded by Mr. James Murdoch, Glasgow, and unanimously carried.

Mr. Aitken proposed that the following parties be recommended to the Council as Examiners for 1854-55:—Messrs. Baildon, Gardner; Williamson, of Aberdeen; Templeton, of Glasgow; Flockhart, Shaw, Macfarlan, Mackay, and the President and Vice-President of the Society *ex officio*. This was seconded by Mr. Ainslie, and agreed to.

Mr. G. Blanshard proposed that Mr. Macfarlan should be returned to London as a Member of Council from Edinburgh, which was also unanimously carried.

Mr. Flockhart proposed, and Mr. H. C. Baildon seconded, that Messrs. Ainslie, Shaw, Young, and Wm. Baildon, should act as Curators of the Library and Museum for the next year.

Mr. Macfarlan recommended that Mr. Mackay be requested to continue as Secretary, and that a vote of thanks should be tendered by the Society to him for his labours, which Mr. Baildon seconded, and to which the meeting cordially agreed.

Mr. Mackay acknowledged the vote and the uniform kindness which had been shown to him by the Members.

Mr. Aitken, before the meeting dispersed, requested permission to move a vote of thanks to Mr. Macfarlan upon his retirement from office, and trusted that he would long be spared to benefit the Society with his presence and support.—Unanimously agreed to.

This closed the proceedings, and the Members adjourned to meet in the Waterloo Rooms at six o'clock in the evening for the purpose of celebrating

THE ANNUAL DINNER.

Upwards of forty gentlemen sat down to dinner, presided over by H. C. Baildon, Esq., the newly-elected President, the duties of croupier having been discharged by James Gardner, Esq., Vice-President. The Chairman was supported on the right by Mr. J. F. Macfarlan, Ex-President; Mr. Smith, of St. Andrew's; Mr. Mackay, the Secretary, &c.; and on the left by Mr. Scott, of London; Mr. Murdoch, of Glasgow; Mr. Flockhart; Mr. Baggott, of London, &c. There were also present Messrs. Shaw, Raimes, Young, Hart of Glasgow, Brown of Dunfermline, G. Blanshard, Robertson, Bremner, Aitken, Ainslie, &c.

The cloth having been removed, the Chairman read apologies for absence from Professors Christison, George Wilson, and Douglas Maclagan, honorary Members of the Society; after which

The loyal and patriotic toasts were given and responded to with great enthusiasm.

The Chairman, in proposing the "Pharmaceutical Society of Great Britain," said it was quite unnecessary for him to do more than express a hope that it might continue to prosper as it had hitherto done. That it had already raised the status of their profession considerably there could be no doubt, but much still required to be accomplished. It appeared to him that their efforts should be principally directed to the successful training of those who would in a few years become their successors, and that could only be done by affording them the time and means of acquiring a scientific knowledge. The session which had just closed afforded sufficient evidence that there were many amongst their Associates and Apprentices perfectly able and willing to avail themselves of every facility that could be given them. The growing importance of the Society was sufficiently obvious, from the fact that they now had the names of nearly 4000 persons on their roll of Members and Associates — a very large number considering the short time it had been in existence. He had no doubt it would go on gradually extending itself, until they would in a few years probably be in a position to go to Parliament and obtain a much more effectual bill than that which Mr. Jacob Bell was able to procure on a recent occasion. They had also reason, he thought, to congratulate themselves upon the success which had attended the Society in another way. It had been the means of bringing them together not only at their Annual and Scientific Meetings, but around the social board, and of breaking down that coldness and restraint which had hitherto existed. The more they saw of each other in this convivial and social manner the better; and he thought both these objects of the Society had been accomplished—as far as they could be considering the short time it had been in existence. They could not with any propriety drink to the prosperity of this Society without remembering that they owed it almost entirely to the efforts of one individual, Mr. Jacob Bell, of London. The Chairman then asked them to dedicate a bumper to the prosperity of the Pharmaceutical Society of Great Britain. (The toast was then responded to with great enthusiasm.)

Mr. Macfarlan then gave "The University of Edinburgh," which was drunk with great cordiality.

The following toasts were then given in succession:—"The College of Physicians and College of Surgeons," by Mr. Robertson; "The President and Council of

London," by the Croupier, and responded to by Mr. Macfarlan, the only Member of the Council present; "The Honorary Members of the North British Branch of the Pharmaceutical Society," by Mr. Mackay; "Jacob Bell, Esq., London," by Mr. Ainslie; "Pharmaceutical Education," by Mr. Shaw; "Board of Examiners and Council in Edinburgh," by Mr. Smith, of St. Andrew's; "The Chairman," by Mr. Brown, of Dunfermline, and acknowledged by the Chairman; "The late President, Mr. Macfarlan," by Mr. Hart, and replied to by Mr. Macfarlan; "Town and Trade of Edinburgh, coupled with Mr. Macfarlan," by Mr. Bremner; "Glasgow and its Commerce," by Mr. G. Blanshard; "Members from a distance," by Mr. Aitkin, and acknowledged by Mr. Hart, of Glasgow; "The Strangers," by Mr. Macfarlan; "The Croupier," by Mr. Raimes; "The Secretary," by the Chairman; "The Retiring Members of Council," by Mr. Flockhart, &c.

Several excellent songs were sung by Mr. T. Hunter, Mr. Francalanza, Mr. Scott, Mr. Ainslie, and other members of the company.

ORIGINAL AND EXTRACTED ARTICLES.

THE CODEX (1837) AND FRENCH PHARMACY.

BY MR. JOSEPH INCE,
Associate of King's College, London.

The Codex is the authorized standard of Pharmacy in France, having the misfortune to be given in French, an error which has led to some of its long and tedious details, which are at best a poor exchange for the short but accurate descriptions of a Latin work.

It is conveniently divided into sixty-three chapters, each one preceded by a brief history of the contents and general remarks. This admirable plan cannot be followed here—time and space forbid. Nor would there be much advantage in such a literal survey, as a real knowledge of the *Pharmacopée Française* can only be gained by actual and repeated reference. The best practical insight will be ensured by an outline of those distinctive preparations, which are recommended either by intrinsic excellence or daily use. Let us enter without further preface on a few peculiar formulæ which meet us on the threshold.

Eau de Barèges.—Eau Sulphurée.

Sodii Sulphuret.
Sodæ Subcarb. (Cristals).
Sodii Chlorid., āā gr. iiss.
Aquæ Destillatæ, ℥xx. Dissolve and filter.

This is intended for medical purposes only. When used for baths or external application, it is then called

Solution pour Bain de Barèges Artificiel.

Sodii Sulphuret.
Sodæ Subcarb. Cristal.
Sodii Chlorid., āā ℥ij.
Aquæ Puræ, ℥x. Mix and filter.

The one should never be substituted for the other, still less should either be made with Sulphuret of Potassium (*Foie de Soufre*) instead of Sulphuret of Sodium. Whilst imbibing Pharmacy from foreign springs, it may be as well to know that French Potash water (*Eau Alcaline Gazeuse*) contains as usual four grains, and Soda water (*Eau de Soude carbonatée*) one grain of the bicarbonate to an ounce.

Eau de Rabel.—Acidum Sulphuricum Alcoolisatum.

Sulphuric Acid, one part.
Alcohol, three parts. Mix by degrees.

The Codex has a strong partiality to this species of solution, as for instance:

Eau Régale.—Acide Nitro-Muriatique.
(Aqua Regia.)

Acid. Nitric, one part.
Acid. Hydrochloric, three parts. Mix

ACIDE NITRIQUE ALCOOLISÉ.—ESPRIT DE NITRE DULCIFIÉ.
(Spirit. Etheris Nitric.)
Nitric Acid, one part.
Alcohol, three parts. Mix.

Such a mixture brings with it its own condemnation, being not only acid, but necessarily apt to decompose.

Two preparations should be noticed for their constant employment, the second differing a little from our own.

LIMAILLE DE FER PORPHYRISÉE.

Iron filings, beaten in an *iron* mortar, until quite bright ; reject the powder, as it contains some oxide of iron, and reduce the bright filings to fine powder.

ARSÉNITE DE POTASSE.—LIQUEUR ARSÉNICALE DE FOWLER.
(Liquor Potassæ Arsenitis.)
Arsenious Acid.
Subcarbonate of Potash, āā five parts.
Distilled Water, 500 parts.
Sp. Melissæ Comp., 16 parts.

Three varieties of Potash are mentioned in the Codex, all of them in extensive use. (*a*) Caustic Potash made by precipitation with Lime from Carbonate of Potash. The Carbonate of Lime thus formed being separated by filtration ; the liquid Caustic Potash evaporated to dryness, and fused, constituting the real *Pierre à cautères*, called pharmaceutically *Potasse Caustique à la Chaux*, not to be translated Potassa *cum* Calce. (*b*) Pure Potash. *Potasse à l'alcool.* This is the former dissolved in three times its weight of alcohol. The clear solution is to be rapidly evaporated and fused, care being taken to remove the black carbonaceous mass which forms on the surface towards the end of the operation.

(*c*) *Poudre de Vienne*, made by simply mixing fifty parts of Caustic Potash with sixty of Quicklime. This powder, before using, should be moistened with a little alcohol, and is a very powerful escharotic.

Sulphuret of Potassium is directed to be made by fusing at a gentle heat—(*à une douce chaleur*) one part of Sulphur and two parts Carbonate of Potash. A method quite impossible—a constant red heat is requisite to effect the change. A saturated solution is made by dissolving one part of Sulphur in three parts Liquor Potassæ, containing when finished nearly half its weight of Liver of Sulphur. This is one of the numerous proofs of ingenuity scattered on every side. Thus the Perchloride of Gold made by the simple agency of Aqua Regia is in itself a very deliquescent salt, but by the addition of a small quantity of common salt, in the proportion of 16 : 85, it can be easily preserved. No less ingenious is the method of recovering essential oils that have been injured by long keeping, which are merely redistilled in water, with a small quantity of the plants from which they were originally produced; or Appert's well known plan of preserving acid juices, such as raspberry or orange; following which, the careful amateur fills up his bottle, well corks it, tightly securing it with string. With great mistrust he plunges it in warm water, there leaves it until the water boils for about one quarter of an hour ; the bottle is then rescued, the cork well rosined, and the contents keep till opened. Why *sal prunella* balls are fused with $\frac{1}{12\frac{1}{8}}$ part of common sulphur is a mystery we have not at present solved. No doubt a proper explanation would add another instance of ingenious skill.

As a book of reference for strictly chemical products the Codex is unrivalled. The details of manufacture and the results obtained are carefully stated. Thus, Quinine is mentioned, and its various salts described, such as the Sulphate, Chloride, Acetate, and Nitrate, as well as the Prussiate of Quinine and Iron. The Sulphate, Muriate, and Acetate of Morphia receive a notice, whilst there is given an ingenious method of converting Strychnine into its acid combinations. Mannite is made by dissolving manna in boiling alcohol, the solution filtered, and then crystallized. Cantharidine, Piperine, Salicine, and Urea, are all described. Why should gentlemen in the country imagine that there is a

charmed circle drawn round Temple Bar, within whose magic boundary wisdom alone resides? Why should they have no confidence in a single chemical unless it bears the London mark, when by the aid of the Codex and a pocket dictionary they could be their own manufacturers, and feel an honest pride in their self-made specimens?

Whilst on this subject a few words on purification may not be out of place. Mercury, as well as Phosphorus, is distilled over into water, then strained through chamois leather. Sulphuric Acid is first heated in a sand-bath with half a drachm of Sulphur to the pound, to free it from Hyponitrous acid, and then distilled, with the usual precaution of adding a small coil of platina wire (*trois ou quatre spirales en fil de platine*). Two-thirds are drawn over, and the first three ounces rejected. The distillation is not to be carried beyond this point on account of the frequent bumping (*des Soubresauts*) occasioned by the accumulation of Sulphate of Lead. Nitric acid (*acide azotique*) is redistilled with Nitrate of Baryta to rid it of all traces of Sulphuric Acid. Nitrate of Silver is first added as a test for chlorine. Fearful of awakening the ire of Professor Redwood, we quote the following extract:—"Oxide of Zinc should be entirely soluble without effervescence in Hydrochloric acid. This solution should give a precipitate with Ammonia quite soluble in an excess of the same." How infinitely superior is the quiet French of this lame English: "L'oxide de zinc doit être entièrement soluble sans effervescence dans l'acide hydrochlorique. Cette dissolution doit donner avec l'ammoniaque un précipité complètement soluble dans un excès d'ammoniaque." French Pharmacy, however, is not always to be translated at a glance. Should any unbeliever read these lines, one trial of page 32 (Oxide of Antimony) perhaps will remove the doubt.

Chemistry, applied or abstract, is most dangerous ground, for it leads to endless lucubrations. Let us hasten from it to the most important, because most useful, subject presented in the Codex.

Syrups.—Les Sirops.

Of plain syrup there are two varieties; the first called Sirop Simple, or Sirop de Sucre, Syrupus Simplex. The whites of two eggs are beaten up with three pints of water, of which one pint is kept in reserve. Twelve pounds of sugar are dissolved in the remaining two pints, with the addition of one pint of common water. Solution being effected by a gentle heat, the whole is allowed to boil, the one pint of albuminous water being gradually thrown in, while the scum that rises to the surface is constantly removed. Afterwards it is filtered through a strainer. The second is the Sirop Simple Blanc, Syrupus Simplex *Albus*, the general basis of the rest.

Sacchari Albissimi, 2℔.
Aquæ Puræ, 1℔.

Dissolve without the aid of heat (*à froid*), mix it with two ounces of prepared animal charcoal, and after twelve hours filter it through paper. With regard to Syrups, especially those made with vegetable extracts, the advantage of filtration cannot be overrated. It recommends them by their clear and bright appearance, whilst with this precaution they keep twice the usual time.

A full description of these medicinal syrups may not prove uninteresting to the English Chemist and Druggist.

Syrupus Acaciæ.—Sirop de Gomme.

Gum. Acaciæ.
Aquæ *Frigid.*, āā ℥j.
Syrup. Simpl., ℥viij.

Wash the Gum Arabic in cold water, and dissolve it without heat; strain, and add the solution to the syrup; let it afterwards *just boil.*

It contains seventy-two grains to one ounce.

SYRUPUS ACID. TART.—SIROP D'ACIDE TARTRIQUE.

Tartaric Acid, one part.
Distilled water, two parts ; dissolve and add
Syrup. Simpl. bullient., 50 parts.

SYRUPUS FLOR. AURANTII.—SIROP DE FLEURS D'ORANGER (or *Sirop de Naphe*).

Aquæ Flor. Aurantii, one part.
Sacchari Albi, two parts.

Dissolve without the aid of heat, and filter.

SYRUPUS BELLADONNÆ.—SIROP DE BELLADONE.

Extract. Belladonnæ, gr. xxxij.
Aquæ, ℥ss. ; dissolve and add
Syrupi Bullientis, ℥xvj.

That is, two grains of extract to one ounce.

Many Syrups are made in the same manner, as for instance :—

SYRUPUS IPECACUANHÆ.—SIROP D'IPÉCACUANHA.

Alcoholic Extract of Ipecacuanha, four grains to one ounce.

SYRUPUS LACTUCÆ.—SIROP DE THRIDACE.

Ext. Lactucæ, eight grains to one ounce.

The next is a much better preparation than our own, for it seldom changes.

SYRUPUS CROCI.—SIROP DE SAFRAN.

Saffron, ℥j.
Malaga Wine, ℥xvj.

Cut the Saffron in small pieces ; let it infuse for two days in the wine ; press and filter; dissolve in the strained liquor,

White sugar, ℥xxiv.,

Using no stronger heat than a water-bath.

The Malaga offers but little objection to the process, as it is well known that foreign wines, like the language, take some time before they reach the head.

CAPILLAIRE.—SYRUPUS ADIANTHI.

Capillaire, ℥vj.
Aquæ Bullientis, ℥xlviij.
Sacchari Albi, ℥lxiv.

Infuse two-thirds of the *Capillaire* in water, and make it into a syrup with the sugar. The remaining *Capillaire* is to be infused for two hours in the syrup, kept hot by means of a water-bath, and then filtered. It is doubtful if *Capillaire* be ever rightly made this side the Channel.

Here is an example of a syrup made from the leaf :

SYRUPUS DIGITALIS.—SIROP DE DIGITALE.

Fol. Digitalis, ℥iij. gr. xij.
Aquæ Bullientis, ℥xvj.
Sacchari Albi, ℥xxxij.

Infuse for six hours, strain and make it into a Syrup with a gentle heat. One ounce contains four grains of soluble matter of digitalis.

Syrupus Opii must not be overlooked, as it is in constant use.

Extract. Opii, gr. xvj.
Aquæ, ℥ss.
Syrupi Bullientis, ℥xvj.

Dissolve the extract in the water, and when filtered, add it to the boiling syrup. One ounce contains one grain.

Syrup. Opii, ℥j.
Sp. Ammon. Succinat., gtt. ij.

constitutes the *Sirop de Karabé ;* this mysterious word is the Persian term for Amber. Closely allied to the Opium syrup is the Syrupus Papaveris—*Sirop de Pavot Blanc ; Sirop Diacode.* This is made from the Alcoholic Extract, six grains

to one ounce. Being an extremely bad preparation, and liable to change, its formula need not be given here. That this is not a private notion M. Cazenave's remark will prove: "Mais il a l'inconvénient de s'altérer facilement, ce qui le fait remplacer quelquefois par le sirop d'opium." It need not be stated that Syrup of Poppy, when well made, will keep at least two years in an unaltered state.

There are many syrups of a far more active nature than the preceding, to which the term *chemical* may not be improperly applied. One will serve as a type for the whole:—

SYRUPUS QUINÆ SULPHATIS.
(*Sirop de Sulfate de Quinine.*)
Quinæ Sulphatis, gr. xxxij.
Syrupi Albi, ℥xvj.
Aquæ Destillatæ, ℥iiss.
Alcohol. Sulphuric., gtt. viij.
(*Eau de Rabel*).

The Quinine is dissolved in the water by the addition of the alcoholic extract, and added to the cold syrup.

The Syrups of Acetate and Sulphate of Morphia are made in the same way, with the respective addition of a little acetic or dilute sulphuric acid. One ounce contains one quarter of a grain of Morphia. The Syrup of Ether, *Sirop d'Ether*, made by shaking up one ounce of Sulphuric Ether with sixteen ounces of simple syrup, is almost as uncertain a preparation as the syrup of Hydrocyanic acid, which should be banished from the Codex. The Syrups of Absinth, Horehound, and Hyssop, are made from the dried tops (*Sommités sèches*) of the plant: those of Gentian, Rhubarb, and Marshmallow (*Guimauve*), are made from the dried root (*racines sèches*), while many, as Asparagus (*Pointes d'Asperges*), Buckthorn (*Nerprun*), Centifolia Rose and Nettle (*Ortie*), are made from the depurated juice.

The Compound Syrups possess but little interest, as they never could be made with advantage by the English Chemist. Syrupus Ipecacuanhæ Comp., called often *Sirop de Desessart*, bears no relation whatever to our Dover's powder; but is composed of Ipecacuanha, Senna, Thyme, and Epsom Salt—not forgetting the white wine. Syrupus Sarzæ Comp., is called in prescriptions *Sirop de Cuisinier*, and the Compound Syrup of Absinth (*Sirop d'Armoise composé*); the one most frequently in vogue contains sixteen ingredients, therefore the less said of it the better. This part of the subject must be concluded; but it would be strange indeed to leave unnoticed one perhaps better known by name than any of the rest—

SIROP D'AMANDES.—SIROP D'ORGEAT.
Amygdal. dulc., 1℔.
— Amar., five ounces.
Sacchari Albi, 6℔.
Aquæ, 3℔ four ounces.
Aquæ Flor. Aurantii, eight ounces.

Blanch the almonds, and beat them into a fine paste in a stone mortar with four ounces of water and one pound of sugar. Mix this paste with the rest of the water and press. Add to the emulsion thus made, the remaining sugar, dissolving it by means of a water-bath at a very gentle heat. As soon as the sugar is melted, add the Orange-flower water, and strain the syrup through some thick muslin.

The final directions are, to put it in well dried bottles and to let them stand on their heads (*renversées sur leur goulot*), which they will be ready to do for joy, as it is the most agreeable syrup that can well be made.

Mellites are syrups made with honey; their preparation need not be described. Mellite simple (*Sirop de Miel*) is Water, one part, Honey three parts. Oxymel oximel simple is White Vinegar, one part, Honey two parts. Oxymel Scillæ oximel scillitique, is Vinegar of Squills, one part, Honey two parts. Radical Vinegar is made by distillation from Acetate of Copper, purified by being again distilled; while Acetum Destillatum is made from wine.

ACETUM CAMPHORÆ.—VINAIGRE CAMPHRÉ.
Camphoræ, ℥j.
Aceti Fort., ℥xl.

ACETUM OPII.—VINAIGRE D'OPIUM, or TEINTURE ACÉTIQUE D'OPIUM.
Opii, ℥j.
Aceti Fort., ℥vj.
Sp. Rectif., ℥iv.

ACETUM ROSÆ.—VINAIGRE ROSAT, is Rosæ Gallicæ Siccat., ℥j.; Acet. Fort., ℥xij.

A few ordinary compounds differ from our own. Hofmann's Ether is a concentrated mixture of equal parts of Alcohol and Sulphuric Ether. An etherial water, *Eau Ethérée*, is likewise made by shaking up one part Ether with about ten parts Water.

CERATUM SIMPLEX.—CÉRAT SIMPLE.
Ol. Amygdal., ℥xij.
Ceræ Albæ, ℥iv.

UNGUENTUM HYDRARGYRI NITRATIS.—POMMADE CITRINE.
Lard.
Olive Oil, āā ℥viij.
Mercury, ℥j.
Nitric Acid, ℥iss.

The Mercury is ordered to be dissolved in the acid with a gentle heat (a precaution quite unnecessary), and to be then added to the mixed lard and oil, half cold (*à moitié refroidis*), which we need not say would result in a total failure. Simple oils, such as Chamomile and Rose, are made by maceration in four times the quantity of Olive Oil.

Conserves usually consist of one part of pulp to one and a half sugar. French Electuaries are of such a complicated nature that they may be left in peace. That strange assemblage called *Thériaque*, boasts of more than seventy ingredients, including roots, seeds, herbs, unmentionables, and one ounce and a half dried vipers. This deplorable nonsense is beyond ridicule, suggesting nothing more strongly than those celebrated lines—

"Let observation with extensive view,
Survey mankind from China to Peru."

It is said to contain one grain of opium in seventy-two—let us hope for the best.

The Jellies—*Gelées;* Pastes—*Pâtes;* Species—*Espèces*, possess no general interest here. They are well described in Beasley's admirable *Formulary*. Besides which, there is always a *trade way* of making them, which excludes all private competition.

It will be sufficient to indicate the strength of the various *Tablettes*—Lozenges.

Tablettes de Mercure doux, or *Pastilles Vermifuges*,	contain each,	Calomel, one grain
Tablettes de Rhubarbe.....	"	Rhubarb, one grain.
Tablettes de Fer..... ..	"	Porphyrized Iron, one grain.
Tablettes de Manne.....	"	Manna, two grains.
Tablettes de Magnésie.....	"	Magnesia, three grains.
Tablettes d'Ipécacuanha ...	"	Ipecacuanha, one quarter of a grain.

Mucilage of Gum Arabic is made with equal parts of powdered gum and *cold water*. Mucilage of Tragacanth ℥j. ℥viij. Mucilage of Linseed ℥j. ℥vj. Camphor mixture—*Eau Camphrée*, contains two grains of Camphor to one ounce. Etherial Camphor mixture—*Eau Ethérée Camphrée*, nine grains of Camphor, and twenty-five grains of Ether to one ounce.

EAU DE GOUDRON.—TAR WATER.
Picis Liquid., ℥j.
Aquæ Communis, ℥xxx.
Shake up from time to time for about ten days, and then decant.

Un Sparadrap is a plaster *spread*, as the common Wax Plaster.

TOILE DE MAI.—SPARADRAP DE CIRE.
Ceræ Albæ, ℥viij.
Ol. Amydal., ℥iv.
Terebinth, ℥i.

How English sticking-plaster is made, *Sparadrap de Colle de Poisson* will reveal, called in plain French *Taffetas d'Angleterre.*

What could the native Briton do without his tea? Not all the ices of the *Café aux Trois Frères* would warm his heart, but he would still sigh for his island beverage. Well then, the Codex, in the kindest manner, offers him the best substitute—a Phtisan. Here are the most popular ones :—

TISANE DE CASSE.—EAU DE CASSE.
Cassiæ Fistulæ (*Casse en Gousses*), ℥ij.
Aquæ frigidæ, Oj.

TISANE DE CHIENDENT.—(TRITICUM REPENS.)
Dog's Grass, ℥j.
Liquorice Root, ℥iiiss.

Boil the Chiendent in a pint-and-a-half of water to a pint. Add the liquorice; infuse for one hour, and strain.

TISANE DE FLEURS DE TILLEUL.
Dried Lime Flowers, ℥ij.
Aquæ Bullientis, Oj.

Infuse for half an hour, and strain. *Tisane de Violettes* is made in the same way.

TISANE DE GOMME.—EAU DE GOMME.
Gum Acaciæ, ℥ss.
Aquæ *frigidæ*, Oj. Dissolve and strain.

TISANE D'ORGE.—EAU D'ORGE.
Pearl Barley, ℥vj.
Liquorice Root, ℥iiiss.

Boil the pearl barley in a pint-and-a-half of water to a pint. Infuse the liquorice root for about half an hour, and strain.

TISANE DE TAMARIN.
Tamarind Pulp, ℥j.
Boiling Water, ℥xxxij.

Infuse for an hour and strain.

These formulæ differ occasionally by a few grains from the authorized quantities, but are so made for household use and in the hospitals. Often one to two ounces of some of the syrups already mentioned are added to improve the taste. *Tisane de Violettes* is in as much request as barley water.

Un Apozême, or rather *Apozème*, is a much stronger preparation than the Tisane. It may be defined as the difference between Twining's tea and other people's. *Les Apozèmes* have no fixed form in general, but are the result of a prescription. One may be given as a sample of the rest.

APOZEMA PURGANS.—POTION PURGATIVE.
Folior. Sennæ, ℥j.
Sodæ Sulphat. ℥ij.
Rad. Rhei., ℥ss.
Mannæ, ℥viij.
Aqua Bullientis, ℥xiv.

Infuse the Rhubarb and Senna in the boiling water for half an hour, and strain. Dissolve the Soda and Manna with a gentle heat in the infusion, and once more strain.

Distilled Waters, for which the Latin term is *Hydrolatum*, form an important item in the Codex; yet there are only three that have a particular interest to ourselves.

EAU DISTILLÉE DE LAURIER CERISE.
(*Aqua Lauri Cerasi.*)
Fol. Lauri Cerasi, 2 parts.
Aquæ, 4 parts.

Cut the leaves and distil over one-half of the water by means of a very gentle heat. It is important that the distillate should be carefully filtered, in order to separate the essential oil, which would otherwise remain in suspension and materially increase the strength.

This is not to be substituted for the following preparation:—

EAU DISTILLÉE D'AMANDES AMÈRES.
(Bitter Almond Water.)
Almond Cake (*Tourteau récent d'Amandes Amères*) two pounds.

Make the Cake into a very thin paste with water, and put it into a retort. Let it macerate twenty-four hours. The retort being placed over a vapour-bath, distil four pounds—that is, the product must exactly double the weight of the almond-cake. This water also must be carefully filtered.

EAU DISTILLÉE DE TILLEUL.
(Aqua Florum Tiliæ.)
Lime Flowers, 1℔.
Aquæ, q.s.

Draw over four pounds of water by means of a vapour-bath. Aqua Florum Sambuci—*Eau de Sureau* is made in the same way.

An old French adage says,

"Il n'y a que les méchants qui sont buveurs d'eau
Cést bien prouvé par le déluge."

Therefore, one word for wine. Vinum Colchici (*Radicis et Seminum*) and Vinum Scillæ are all made in the proportion of one ounce to sixteen ounces Malaga wine. Vinum Antimon, *Vin Émétique*, two grains to the ounce; Vinum Opii, *Laudanum liquide de Sydenham*, one grain of Extract of Opium to twenty drops; *Vinum Opii Rousseau*, unlike the former, contains no aromatics, and is made by fermentation.

Opii, ʒiv.
Mellis, ʒxij.
Aquæ Calidæ, 3℔ 12 ozs.
Yeast (*levure de bière fraîche*), ʒiiss.

A sort of spruce beer is called *Sapinette*.

The difference between a *Teinture* and *Alcoolat* is, that the first is made by maceration in spirit, the second by distillation, while the term *Alcoolé* is the same as *Teinture*. Few remarks will be requisite, as simple reference is much better than description.

TINCTURA CAMPHORÆ.—ALCOOL CAMPHRÉ.
Camphoræ, ʒj.
Alcohol, ʒvii.

When made much weaker, in the proportion of ʒj. ʒxl., it is then called *Eau de Vie Camphrée*.

TINCTURA SAPONIS.—TEINTURE DE SAVON.
White Soap, ʒiij.
Subcarbonate of Potash, 72 grains.
Alcohol, ʒxij.

This deserves a little credit for its ingenuity:—

TINCTURA OPII.—TEINTURE D'EXTRAIT D'OPIUM.
Ext. Opii, ʒj.
Alcohol, ʒxij.

The Compound Tinctures scarcely need a mention; their contents are so numerous as to inspire fear—of leaving some of them out. Tinctura Aloes Comp. is the *Elixir de Vie;* Tinctura Aromatica, is the *Essence Céphalique*, or *Bon Ferme;* Tinctura Jalapæ Comp., is the *Eau de Vie Allemande*. Etherial Tincture of Perchloride of Iron possesses some interest from its occasional use with us.

Ferri Chloridi, ʒj.
Hoffman's Anodyne, ʒvij. Mix.

Nothing now remains but to throw a little light on French Prescriptions. Practice makes perfect, but no amount of shrewdness can supply the deficiency of a well-grounded study of Nöel and Chapsal's Grammar. There is no revolutionary road to foreign languages. There are, however, some expressions which the Academy Dictionary ignores.

Blanc de fard, is Bismuthi Subnitras.
Cristal Minéral, is Fused Purified Nitre.
Éthiops Martial, is Ferri Oxydum Nigrum.
Foie de Soufre, is Sulphuret of Potassium.
Foie de Soufre calcaire, is Sulphuret of Calcium.
Magistère de Soufre, is Sulphur præcipitatum.
Pierre infernale, is Fused Nitrate of Silver.
Précipité blanc, is Calomel prepared by precipitation from Nitrate of Mercury by Hydrochloric Acid in slight excess, quite distinct from our White Precipitate.
Sel Végétal, is Potassæ Tartras.
Sel de Seignette, is Sodæ Potassæ Tartras.
Morelle (*la*), is Solanum Nigrum.
Thridace, is Extractum Lactucæ.

The reader will be relieved to find that he will not be treated to a long definition of weights and measures. One kilogramme, for all general purposes, means 2℔ avoirdupois; ℥j. is 24 grains; 1 gros, 72 grains. The gramme in practice may be considered half a drachm, sixteen ounces make one pound, and a quateron means four ounces. No little haze invests the popular method of indicating a dose.

Une cuiller, sometimes *cuillère*, a spoon.
Une cuillerée, a spoonful.
Une cuillerée ordinaire, a tablespoonful.
Une cuiller à bouche, five drachms.
Une cuiller à café, one drachm and a quarter, *i. e.* a large teaspoonful.
Un verre, a glass containing five ounces.

A few terms are employed in describing powders, such as *passer au tamis*, pass through a sieve, either *de crin*, horse hair, or *de soie*, bristle (not silk). Some are prepared by the aid of a *pilon de bois*, or wooden pestle, or reduced *au moyen de la râpe*, by rasping; *couper par tranches* is to slice, *cribler* to sift, *ratisser* to scrape, *vanner* to winnow, and *égoutter* to drain. While for syrups, *un blanchet* is a strainer; for tinctures *le marc* means the grounds or remainder from pressing, and the tub for the operation is *un seau en bois*. (*Poids de marc* means eight ounces.) *Toile de coutil* is ticking, and *une chausse* a straining bag, consequently *passer à la chausse* is to strain. In Pharmacy *fer étamé* means tinned iron, *un entonnoir à déplacement* is a percolator, *une crûche de grés*, so often mentioned, is a brown glazed earthenware vessel, *un camion* is also a matras of burnt clay, *un bain-marie* is a water-bath, *les eaux-mères* the residual liquid of a saline crystallization, *les zestes* thin orange-peel cuttings, and that most perplexing thing *un grumeau* a lump, *à jeun* fasting, *la charpie* lint, *l'ouate* wadding, which, when made into a pledget, is called *un plumasseau*.

Une Potion is the word Mistura, when thick or mucilaginous called *Looch*, sometimes *Look*. Would it be indelicate to mention that *Pommade*, when meant for French, has got two m's, *Pastilles* two ll's? the English for this is not Pastile but Pastil. *La Cannelle* means Cinnamon, and not *Cannella Alba*, which is invariably specified as *La Cannelle blanche*, hence *Poudre ou Teinture de Cannelle* is Pulvis vel Tinctura Cinnamoni. The contractions used are of no importance—*f.* means *faire*, *fiat*. *P. ég. parties égales*, *partes æquales*: *Qq. quantité quelconque*, *Q. S.* M. D. S., Misce, Dona, Signa, not Misce, Detur, &c., which is bad Latin. Two remedies so often used at home are scarcely ever given abroad—Prussic acid, which is considered dangerous and uncertain, and

Calomel, which is always smiled at as an English folly, thus in *Tras los Montes, l'Anglais pur* is divided between his Tea when well, and his Calomel when ill.

Three works will be found of especial service in following out the subject:—*Eléments de Chimie*, M. Orfila. *Nouveau Traité de Pharmacie théorique et pratique*, Soubeiran. *Histoire Abrégée des Drogues Simples*, Guibourt.

Care must be taken not to translate too literally, else the most frequent direction of the Codex *passez avec une légere expression*, would convey a stronger notion that the subject should be treated with indifference than that it should be gently strained and filtered. Warning also is afforded by the venerable anecdote according to which the sign of the road-side inn, *içi on loge à pied et à cheval*, was rendered, Here they lodge on foot and on horse, not much accommodation for either man or beast.

Here let us take a lingering farewell. The subject has the strongest personal interest for the writer. It calls back the recollection of that happy year, when a small room, with a red-brick floor, was the solitary student's home; coffee and a wood fire his height of luxury. The Winter brought with it its snows and Chemistry; Summer its fierce heat and Botany. Pharmacy just now enthroned in the person of Soubeiran, where Orfila reigned so long, was indeed at a low ebb, though it did its best to struggle on in the Rue d'Arbalète. But it would ill become a stranger not to acknowledge the genuine kindness of its professors, and the deep regret with which he left behind his companions of the Quartier Latin. Truth must be spoken—Medicine ruled all at Paris. The *Ecole de Médecine* held out every temptation. Its noble amphitheatre could and did hold more than a thousand persons, who both here and at the Sorbonne, fairly blocked up the windows in their anxiety to attend. Its library contained about 30,000 volumes, to which, as well as to its museums, access was free; while the learner who wished to exchange books for Botany, was sure of finding a warm reception in the *Rue d'Enfer*. The associations of the spot are as clear and bright as ever, and have helped more than once to triumph over the dreary monotony of long hours and the drudgery of business; for has not the most enthusiastic sometimes felt occasions on which he would willingly have consigned Pharmacy and its accessories to that bourne from which no traveller returns? May we invite the English Chemist to similar relaxations? The regular employment of one hour a day would overcome every obstacle by December.

There is no nationality in Science, no other barrier exists between us and the Wisdom of the World but the fetters of a separate language—remove them when you can. There was a time everything French was deemed frivolous, and Frenchmen thought absurd. Rapid communication and mutual intercourse have removed the remaining prejudice ignorance had left. It has been found out at last that there are equally profound studies and devoted students on both sides the Channel. France has bequeathed Lavoisier, England has given Sir Humphrey Davy. The high road to self-respect is mutual good-will and just appreciation. Change is the atmosphere of Paris. Wave after wave has rolled over it, with all the swift unreality of a dissolving view, from Charlemagne to Napoleon, until the transformations of the gay city can astound no more; now red with blood, now decked out for a holiday. Science remains the same, unaltered save in advancement, for Truth has its own inherent Royalty: Science rests upon it. The remembrance of our late residence will never fade away—the spell is unbroken and the charm remains.

31, *Southampton Street, Covent Garden.*

THE MEDICINAL PLANTS OF AUSTRALIA.

BY P. L. SIMMONDS, ESQ.

Scientific research and investigation is opening up much valuable information in various quarters of the world. The officers of the East India Company's territories are from time to time contributing many useful papers to the

periodicals of the day. The medical officers of the navy and army in our own service and that of the United States are more alive than formerly to the importance of accumulating useful facts respecting the indigenous plants of various localities, and their reputed properties as remedial agents. The valley of the great Amazon River, the Parana, Paraguay, Magdalena, and other tributary streams of the various South American Republics are now opened up by steam navigation, and much new information may be anticipated as to the products of those comparatively unknown regions of the interior.

Even in another quarter, in our southern possessions at the Antipodes, where little information relating to Pharmaceutical products was to be anticipated, in the present exciting thirst for gold, some valuable facts have recently come to hand. Dr. Ferdinand Mueller, who was not long ago appointed Government botanist at Melbourne, has already explored the colony of Victoria, under his charge, in various journeys made into the interior from February to June, and has submitted a general report of his researches and discoveries to the Colonial Governor, under date Sept. 5, 1853. This report is exceedingly interesting in a botanical point of view, but it is only that portion bearing upon the peculiar feature to which your Journal is devoted that I shall proceed to give an abstract of.

The inestimable truth, that we may safely deduce the closest affinities of the medicinal properties of plants from their natural alliances—a truth which achieved the most complete triumph of the natural system over all artificial classifications—will generally guide us in tracing out which plants might be administered in medicine. By this guidance Dr. Mueller observed that the Australian Thymeleæ were pervaded by that acridity for which the bark of *Daphne Mezereum* is employed; that the *Polygala veronicea*, the only described Australian species of a large genus, and in close relation to one lately discovered in the Chinese empire, not only agrees, like some kinds of *Comesperma*, with the Austrian *Polygala amara* in those qualities for which that plant has been administered in consumption, but also participated in the medicinal virtue of *Polygala Senega* from North America. *Gratiola latifolia*, and *Gratiola pubescens*, *Convolvulus erubescens*, and the various kinds of *Mentha* are not inferior to similar European species. The bark of *Tasmannia aromatica* appears to possess the medicinal properties of the Winter's bark gathered from a similar tree in Terra del Fuego; and its fruit is allied to that of the North American Magnolia, used in cases of rheumatism and intermittent fever. The whole natural order of Goodeniaceæ, with the exception perhaps of a few species, contains a tonic bitterness never recognized before, and discernible in many plants in so high a degree, that Dr. Mueller was induced, for this reason, to bestow upon a new genus from the interior the name of *Picrophyta*. This property, which indicates a certain alliance to Gentianeæ, deserves the more consideration, as the true Gentianeæ are so sparingly distributed through Australia, while the Goodeniaceæ form everywhere a prominent feature in the vegetation. "Our alps, however (remarks the Doctor), enrich us also with a thick-rooted Gentian (*G. Diemensis*), certainly as valuable as the officinal *Gentiana lutea*, and in the spring, *Sabœ evata*, *Sabæ abidiflora*, and *Erythræa Australis* might also be collected on account of their bitterness. The bark of the Australian Sassafras (*Atherosperma moschata*) has obtained some celebrity as a substitute for tea; administered in a greater concentration it is diaphoretic as well as diuretic, and has for this reason already been practically introduced into medicine by an eminent colonial physician.

Isotoma axillaris surpasses all other indigenous Lobeliaceæ in its intense acridity, and can be therefore only cautiously used instead of *Lobelia inflata*. The root of *Malva Bebriana* scarcely differs from that of *Althæa officinalis*, and Salep might be collected from many Orchideæ. Few may be aware that the Cajeput oil of India is obtained from trees very similar to the common

Melaleuca of Australia; that even from the leaves of the *Eucalypti* an oil can be procured of equal utility. The Sandarac exuding from the Callitris or Pine tree; the balsamic resin of the grass trees, and moreover the *Eucalyptus* gum, which could be gathered in boundless quantities, and which for its astringent qualities might locally at least supersede the use of kino or catechu, will probably at a future period form articles of export.

Several Acaciæ are of essential service, either for their durable wood, or for the abundance of tannin in their bark, which has rendered them already useful, or for their gum, but the latter is even excelled in clearness and solubility by that obtained from *Pittosporum acacioides*. This species, as well as many other plants of the same order, is distinguished by a surprising yet apparently harmless bitterness, a quality that warrants our expecting considerable medicinal power, and which deserves so much more attention, as till now we knew nothing of the usefulness of the *Pittosporeæ*, although this order extends over a great part of the eastern hemisphere. The Australian manna consists in a saccharine secretion condensed chiefly by the cicades from a few species of Eucalypti, but it is chemically very differently constituted to the Ornus manna, and much less aperient.

The orange-yellow gum, or acaroid resin, secreted by the grass tree (*Xanthorrhœa hastile*), resembles very much in appearance, though not in quality, gamboge; externally it has a dull yellow appearance, but breaks with a bright yellow fracture, and is often streaked internally with red. In its natural state it has no fragrant smell, but by the action of fire it diffuses an agreeable odour, resembling frankincense.

It exudes spontaneously from the trunk in very small globules, and is found in very thin layers about the base of the petioles of the leaves, but may be melted into larger masses.

The resin (more commonly known as the gum acaroides) is slightly bitter, pungent, and astringent, and has been used in dyspeptic, dysenteric, and other cases; but not with such success as to cause it to be admitted into our *Materia Medica*.

"Black-boy gum," as it is locally termed, is obtained from another species (*X. arborea*); it is a red brittle resin. These valuable resins may be obtained in the various Australian settlements, in large quantities and at a low price. They are gradually coming into use in the manufacture of varnish, and for other purposes, being in some respects quite as good as, if not superior to, shell-lac.

All the splendid Diosmeæ of Australia—a real ornament to the country—approach more or less in their medicinal effect (diuretic) to the leaves of the South African Buchu bushes (*Barosma crenulata*).

Bæckia utilis, from Mount Aberdeen, Victoria, might serve travellers in those desolate localities as tea, for the volatile oil of its leaves resembles greatly in taste and odour that of lemons, not without a pleasant peculiar aroma.

Trigonella suavissima proved valuable as an antiscorbutic spinach in Sir Thomas Mitchell's inland expedition; and the *Tetragonella implexicona*, the various *Cardamines*, *Nasturtium terrestre*, or *Lawrencia spicata*, may likewise be used for the same purpose.

It would be out of place here to touch upon the culinary plants; but I may incidentally notice that Dr. Mueller suggests that the root of *Scorzonera Lawrencii*, a favourite food of the Australian aborigines, would form, if enlarged by culture, an agreeable substitute for *Scorzonera hispanica*, or asparagus; and *Aristome glacialis*, a large-rooted umbelliferous plant from the snowy top of Mount Barker, will probably be added hereafter to the culinary vegetables of the colder climates.

AMERICAN PHARMACY.

BY EDWARD PARRISH.

Among the Druggists in the United States, who in number amount to some thousands, there are individuals of every grade and qualification; *some* educated chemists, *many* men of moderate attainments in science, and *more* whose knowledge is chiefly confined to the art of making money. There is no less variety among these in the extent of their business and the success attending its prosecution. There are a few who sell annually to the amount of 100,000 dollars, but many more, who by unceasing application sell scarcely 2000 dollars worth in a year. These Druggists comprise individuals who are "clothed in fine linen and fare sumptuously every day," and others who answer to the description of the lean, half-starved apothecary.

Notwithstanding these wide differences in scientific, social and business position, this whole class of "Druggists," or "Apothecaries," or "Chemists and Druggists," as they are variously called, have certain interests in common which constitute a natural bond of union between and among them, and call for a fusion of their diverse elements of strength into one professional fraternity, self-protective as regards its own interests, and eminently humane and beneficent as regards the public at large.

As the object of the present series of essays is to point out some of the advantages to be gained by a more complete organization of our profession, and to give as far as possible an impetus to the awakening spirit of Pharmaceutical reform, it will be a fitting commencement to specify in a few words the peculiar position, duties and responsibilities that pertain to our business, and require that it should be guarded by special precautions from the influences to which ordinary trades are subject.

The close connexion of the business of Druggist and Apothecary with the public health, separates it from exclusively mercantile trades, and requires of its votaries a more accurate acquaintance with exact science and a higher tone of professional bearing than pertains to the mere business man. We may thus sum up these peculiar duties.

1st. To secure to the public a drug market, comprising every known substance used in the cure of disease, whether of vegetable, animal, or mineral production, of foreign or domestic origin, each containing as perfectly preserved as possible its natural curative principles, and fully realizing the promise of nature in its bestowment on man.

2nd. To modify by artificial processes, to prepare and to combine together these drugs, so as to adapt them to use in the treatment of disease whether under the direction of the physician or otherwise.

3rd. To exert the influence pertaining to his position, intermediate between the physician on the one hand, and the people on the other, so as to strengthen public confidence in the *science* of medicine, and to unveil the pretensions of quackery. It is peculiarly his place to impart a correct knowledge of the nature and the position of medicines, and the ill effects of their injudicious use, and also to guard against the too free diffusion of poisons.

4th. The science of pharmacy being specially entrusted to the keeping of Druggists, it is the duty of each member of the profession to impart the fruits of his observation and experience to his fellow-labourers in the same vocation. It is by the fulfilment of this duty that Pharmacy has grown from an obscure and empirical art to its present improved position among the practical sciences, and may be greatly advanced toward a higher and more perfect art.

5th. Connected with the foregoing is the duty we owe to those who are hereafter to assume the duties and responsibilities of the profession. To discountenance a superficial scientific and practical education, and to impart to those placed under our care the requisite knowledge and skill; to imbue them with a high appreciation of the importance and responsibility of their calling, and of its connexion with the physical sciences, and to suppress every tendency to professional quackery, are duties which the present generation owe to the future, and on the fulfilment of which the future progress of our art depends.

The common bond of union which these duties to the public and to each other, and the community of interests growing out of them, seem to furnish, has until recently produced no such general union of purpose and action among the Druggists of the United States as might have been anticipated.

Indeed, to a great extent, these duties and obligations so abundantly acknowledged abroad, and many of them made the subject of legal enactments in Europe, have been but too little recognized here. The people occupied with developing the natural resources of a new and uncultivated country have given little attention to those arts and accomplishments which are inseparable from a high state of civilization and refinement, and our Druggists, like most other business men, have looked almost exclusively at the pecuniary relations of the trade, and with a few exceptions in the large cities have had no special concern about its scientific and ethical relations.

It is only recently that we are beginning to find out the great law that regulates our progress. That while in regard to the apparent *necessities* of life the supply always follows the demand; in regard to its *refinements* and *elegancies*, the reverse is the case; the demand grows up under the stimulus of increasing supply. A retrospect of the last thirty years is full of instruction in this particular. Not long since there were scarcely half-a-dozen sets of Apothecaries' weights in Philadelphia. There were so few shops that could be depended on, that prominent physicians preferred dispensing their own remedies. Even the best Druggists could scarcely make a respectable show of bottles upon their shelves from the paucity of Materia Medica then in use, and the chief reason that made the business lucrative, was its association with other branches of trade, and the absence of any great competition.

The establishment of Colleges of Pharmacy in Philadelphia, New York, and Baltimore, was the first cause of favourable change. The members of these institutions by association learned to sink petty jealousies in a united effort for the common good; they set about self-improvement, and commenced to teach their apprentices how to become better Chemists and Pharmaceutists than themselves. They called forth a spirit of activity in the field of experiment and observation, and as a result a home Pharmaceutical literature sprung up, a National Pharmacopœia was adopted, the *U. S. Dispensatory*, and *Elis's Formulary* were issued from the College of Pharmacy faculty, a general improvement begun to manifest itself in every department of the business, and brought a corresponding increase of public patronage. Thus a higher appreciation of the Pharmaceutic art, and a more liberal spirit toward its votaries growing out of efforts originating with the Druggists themselves, have taught the descendants of these worthy pioneers that the further elevation and improvement of their profession rests on their own shoulders; and that in union there is strength.—*American Journal of Pharmacy.*

(*To be continued.*)

MANUFACTURE AND CONSUMPTION OF QUININE IN THE UNITED STATES.

This medicine has been taken into consideration by the American Secretary of the Treasury in his proposed revision of the Tariff. At one time it was classed in the list of free articles, but subsequently it was excluded, and the proposition is now to increase the duty upon it. Heretofore this drug, so universally used, was subject to a duty of 20 per cent.—the proposed alteration will raise it to 25 per cent. It is computed that about 300,000 ounces are consumed annually in the United States; but if it is used elsewhere in anything like the ratio it is used in the city of New Orleans during the fever, or summer season, the consumption must greatly exceed that quantity. There are two manufacturers of the article in America, and they have grown rich at the business. Some discussion seems to have been going on lately as to the comparative value of the home-made and the imported quinine, for we find the following letter in a recent number of the leading commercial paper of that city, *The New Orleans Bulletin*:—

Dear Sir,—We call your attention to the article in this morning's *Bulletin* in relation to the sulphate of quinine, in which you do great injustice to the American manufacturers by pronouncing the quinine of their manufacture inferior to that imported, whilst, on the contrary, it is almost universally conceded that it possesses a higher standard of value and quality, and consequently commands a higher price; which may be easily ascertained by reference to the New York *Commercial Price*

Current, which quotes separately American and foreign quinine, and almost invariably the former is quoted at the higher price. This preference arises from the high reputation of the two American manufacturers (Rosengarten & Denis and Powers & Weightman), and from the greater confidence in the quality of the bark used by them than in that which is now used by the European manufacturers.

Unless it be Jobst, of Germany (who has *rejected* it), it is admitted that the European manufacturers have used for the manufacture of quinine the bark gathered in New Granada, which is much cheaper in price than the Peruvian or Calisaya bark; and it is, to say the most in its favour, a disputed point amongst eminent Chemists whether quinine manufactured from this (New Granada bark) possesses all the qualities attributed to that of the genuine Calisaya bark. At all events, its recommendation is from those manufacturers who perhaps have used it, because it is one-fourth less in price, which, to say the least of it, is very doubtful authority in its favour.

It may have escaped your notice that some two years since Dr. Bayley, the Inspector of Drugs of the New York district, and a gentleman of high medical reputation, and the Inspector at Philadelphia, *rejected* all the quinine imported in those districts, alleging that it was quinidine, and not the genuine sulphate of quinine, in consequence of its being manufactured from these inferior barks; and it has only been permitted to be entered under an order from the Treasury Department admitting all articles of bark and quinine containing *a certain per-centage* of quinine. It is not denied that the lower price barks contain a certain proportion of quinine, but the question at issue is whether some of the essential principles are not wanting.

Your obedient Servants,

New Orleans, February 22, 1854. E. J. Hart & Co.

ON THE MANUFACTURE OF ALUM AND SULPHATE OF ALUMINA.

In 1450 we read of alum as a costly article in great demand, procured mostly from the Genoese, who had farmed some alum works from the Turks near Smyrna. Henry VI., after trying many ways to make money, besides that of alchemy, in this year turned a penny by an adventure in alum. He purchased a quantity for which he gave £4000, and resold it to some merchants for £8000, and by this means put a sum equal to £34,000 of our present money into his pocket. The merchants, nevertheless, made a profitable bargain, for kings do business at most times out of the common manner. Henry issued a proclamation, which was probably part of the agreement, prohibiting the importation of alum for two years, during which time all the dyers in the kingdom were at the mercy of the speculators. The cloth made in Italy in 1450 was sent to Constantinople to be dyed on account of the abundance of alum in that neighbourhood. At this time 300,000 pieces of gold were paid to the Turks for this article. In 1458 alum was discovered and made at Volterra, and by John de Castro in the Papal territories in 1468. His Holiness understood his own interest so well, that he never rested until he had caused all the works in the territories of his neighbours to be abandoned, and he alone remained master of the prize. He then endeavoured to prevent foreigners acquiring a knowledge of the art of boiling alum, entered into treaties with other nations to supply them with it, and to increase his trade he gave out that he meant to devote the profits to the defence of Christianity against the Turks. If any one was so unchristian as to buy alum of the Spaniards, who had small quantities to dispose of, or from the Turks or Genoese, who had some alum works near Smyrna, he was first admonished, then threatened, and finally excommunicated.

In 1566 letters patent were issued to Cornelius de Vos, a Dutchman, for making "allom and copperas." A Bill passed the House of Commons confirming the grant, which it appeared De Vos had assigned to Lord Montjoye. For several reasons it may be considered one of the most important of the age. Alum was used in great quantities by dyers, to whom it was essential, and its price from the Papal monopoly was very high. At this time some alum works were erected in Germany, but they do not appear to have prospered. De Vos may have been from one of these manufactories. Nothing is known of his or Lord Montjoye's subsequent proceedings. It appears, however, that shortly after this date alum works were erected at Gisborough, in Yorkshire, on the estate of Sir Thomas Chaloner.

The principal alum works in this country are those of the Marquis of Normanby,

at Whitby, in Yorkshire; of Mr. King, at Hurlet, near Glasgow; and of Messrs. John Wilson and Sons and Mr. King, at Campsie, in the neighbourhood of Glasgow. Such ample accounts of the mode of conducting the manufacture at these establishments have been published in Nicholson's Journal, Ure's Dictionary of Arts, and Knapp's Technology, that it will be needless here to dilate on the processes there employed; we shall, therefore, confine our attention chiefly to a description of various new processes of recent date, which have been introduced into the manufacture of alum. The process of manufacturing alum consists of three distinct operations: firstly, the formation of sulphate of alumina; secondly, the addition to this sulphate of alumina, of a salt of potash, soda, or ammonia, to form a crystalline and soluble double salt, technically called alum; and thirdly, the formation of large masses of the alum, in the state in which it is met with in commerce, by means of "roaching" or "rocking." In all the various processes we shall have occasion to notice, the difference between one process and the others, lies in the first and most essential operation, that of obtaining the sulphate of alumina; the formation of alum and its preparation for the market being in each case the same.

At Hurlet, the aluminous schist lies between the stratum of coal and limestone. By the action of the air it undergoes decomposition and falls down on the floor of the mine. The sulphur attracts oxygen, and is converted into sulphuric acid, which combines partly with the iron (oxidized by the air) and partly with the alumina. The solution obtained by lixiviating the decomposed schist, is evaporated, and the sulphate of iron allowed to crystallize: to the mother-liquor, which contains sulphate of alumina, sulphate of potash or chloride of potassium from the soap-boiler's is added, and crystals of alum (sulphate of alumina and potash) are obtained. Sulphate of ammonia is now generally used instead of potash in the manufacture of alum.—*Pereira.*

At Whitby, large beds of aluminous shale or schist, containing sulphide of iron, are found. This shale, mixed with coal found in the same beds, is piled up in large heaps or mounds, and submitted to slow combustion, the sulphuric acid obtained by decomposition of the sulphide of iron uniting with the alumina of the schist, forms sulphate of alumina, which salt, being removed from the calcined schist, by lixiviation with water, forms an aluminous solution, to which sulphate of potash, chloride of potassium or sulphate of ammonia is added, and the double salt of alumina and potassa or ammonia, as the case may be, thence obtained, having been put into leaden pans, with as much water as will serve to make a saturated solution at the boiling point, the solution is run into large casks called "roaching casks," whence the alum is obtained in large crystalline masses, in the state ordinarily met with in commerce. As the shale contains iron and magnesia, a certain quantity of the sulphates of iron and magnesia are also formed; part of the former is decomposed to furnish sulphuric acid, whilst another part remains mixed with the sulphate of magnesia forming the "rough Epsoms" of the alum-maker.

From a working of 150,000 tons, it has been calculated that 130 tons of calcined shale produce, on the average, one ton of alum.

Mr. Kagenbusch patented in Oct. 13, 1842, the following process for obtaining alum from the alumino-pyritous schists. He makes a heap of the schist broken into small pieces of the usual size for burning, moistening the heap continually, during its formation, and carefully covering up the top and sides with a plastering of clay or mud, so as to prevent the escape of the gases arising from the decomposition of the pyrites. Care is to be taken to make and keep this covering as tight as possible. The heap is to be kept in this state for a period varying from three to eight months, according to the quantity and quality of the schist. After this process, it will be found that the sulphate of alumina and other salts have been formed. The schist so prepared may be lixiviated in the usual manner. He then subjects it to a process of burning in kilns, or in heaps so formed, as to act as kilns in regulating the combustion. He constructs a kiln of any convenient dimensions, as from seven to eight feet wide, six feet high and thirty-six feet long, or any other convenient length. In the bottom of the walls of the kiln on all sides, air holes are to be left at a distance of about three feet. Either wood or coal may be used as fuel, but Mr. Kagenbusch states that he has discovered that turf or moorland parings are peculiarly economical and advantageous for that purpose. This turf is laid on the floor of the kiln, of about one foot in thickness, the turfs being set edgeways and so arranged that the air may circulate through the kiln. Upon the turf is piled the

alum schist prepared as before explained, to a depth of from two to three feet. The turf is then set fire to. The combustion is to be regulated by the air holes, so as to be as slow as possible. As the combustion goes on, the matter in the kiln sinks, and gradually gases may be perceived to escape. At this instant, the kiln must be further filled up. This further supply of prepared schist takes fire from that below, and becomes gradually kilned, so that again the gases may be perceived to escape. This process is continued until the kiln is filled up, when a covering of clay is put on to prevent the escape of the gases, and the air holes are also stopped. The combustion being thus stopped, the closed kiln remains for about three days, and if on opening it, at any part, no gases escape, the process is completed, and the burnt or kilned alum schist is to be lixiviated and treated in the usual manner, according to the further improvements after mentioned.

It should be stated that the construction of the kiln may be varied, and where of considerable height, like some lime-kilns, the process may be made continuous, by drawing from time to time from below, as it is found in practice that the lower portion of the schist under process is stopped in its combustion, notwithstanding the upper part is burning. The advantages derived from the above process of kiln burning of previously prepared schist and the use of turf or moorland parings, may be partially obtained by forming small heaps of schist and turf covered with clay or other materials, leaving passages for the air, so that the combustion may be regulated as desired.

Mr. Kagenbusch's other improvement consists in lixiviating the above schist with such an addition of kelp as will furnish the alkaline base. For this purpose, the prepared schist, in small pieces, is put into pits with the kelp of commerce broken small, and spread over the pits and lixiviated together. Also the raw liquor of the schist may be applied to lixiviate the kelp, and extract therefrom the alkaline base of the alum. If the kelp be of good quality, and perfectly lixiviated, about three-quarters of a ton of kelp is sufficient for the quantity of prepared schist required to make one ton of alum. The liquor thus obtained, is treated by evaporation, crystallization, and roaching in the usual way.

Manufacture of Alum from Calcined Shale and Sulphuric Acid.—A patent was granted Nov. 27, 1845, to Mr. Peter Spence, for a mode of obtaining alum from calcined shales and claystones, by means of dilute sulphuric acid, without pounding or evaporation. In order to obtain alum in this way, the following instructions were given :—

The blaze, candle-slates, and other bituminous shales and fire-clay stones, are first broken into lumps about the size of the stones used in making roads, and then calcined in the following way : Bricks are placed on edge in parallel lines, about four inches apart from each other, and covered with another series of bricks laid across the top, in such a manner as not to prevent and obstruct the air from passing between them. The bricks thus placed, form flues or channels. These flues are parallel to each other, and about two feet asunder ; on these flues burning coals are laid, and on them the most bituminous of the shales (taking care not to extinguish the fire), and then the less bituminous if there be a difference, and the whole allowed to become red hot ; a white heat must be avoided, as it would fuse a part of the mass, and thus render it less soluble in the sulphuric acid. If clay-stone be the substance under treatment, small coal or saw-dust must be mixed through it, to insure perfect calcination. The calcined mass is then put into a wooden cistern lined with lead, and covered with dilute sulphuric acid, of sp. gr. 1.25 or 1.30, and heated by steam-pipes or otherwise, to about 200° Fahr., for about six hours the first operation. The solution is then drawn off, and a further portion of dilute acid added, and the same process is repeated six or seven times, but the time of maceration must be increased with every fresh addition of acid, the last occupying about forty-eight hours after the last addition of acid ; the solutions as they are drawn off, are run into shallow cisterns or coolers to crystallize. After the last solution has been run off, water is run on to the mass so as to cover it, and this water, together with the mother-liquors, is used for diluting the sulphuric acid used in the next batch.

Mr. J. T. Wilson introduced in 1849, March 28th, the following improvements on Mr. Spence's process : instead of introducing the diluted acid or mother-liquors into the digesting vessel containing the shale in a cold state, and heating them in the same vessel, Mr. Wilson directs the liquors to be heated in a separate vessel to the required temperature for acting efficiently on the shale, preferring to use the waste

heat from the furnace of the heating vessel, merely to keep the digesting vessels from cooling, by passing it under and around them ; a considerable saving of fuel is thus effected, as well as a more uniform and perfect digestion of the shale obtained.

Another improvement made by Mr. Wilson, relates to preventing the loss of the large quantity of sulphuric acid which takes place in the manufacture of alum by Mr. Spence's process. This loss he considers as arising from the formation of certain compounds of sulphuric acid with alumina, or with alumina and iron, and which acid then ceases to be available for acting on the shale, so as to form sulphate of alumina. Hitherto, the practice had been for the strong mother-liquors which contain these compounds most abundantly, to be repeatedly used as diluents of the acid, in which case they are thrown out of solution, and the acid they contain is lost. In order to prevent this loss, Mr. Wilson directs that the strong mother-liquors left over after depositing the alum formed from the combination of the sulphate of alumina with the sulphate of ammonia, should not again be used to dilute the acid, but be combined with ammoniacal liquor from the gas-works or elsewhere, thereby decomposing such compounds, whilst their acid by this combination forms a solution of sulphate of ammonia. As these liquors, however, contain alum, which it is desirable not to decompose, care must be taken not to add sufficient ammoniacal liquor to neutralize the whole of the acid. When the solution of this mixture of sulphate of ammonia and alum, after filtration and settling, is sufficiently concentrated by evaporation, it is run in amongst the solution of sulphate of alumina from the digesters, when the alum therein is deposited in the coolers with the newly-formed alum. By this process shale is made to yield its own weight of alum, one ton of shale of fair average quality giving one ton of alum.

Mr. Spence's more recent improvements (date of Nov. 12, 1850) in the manufacture of alum from shale are carried out practically in the following manner:—*First Process.* Into a leaden vessel or tank, placed in brickwork, about four feet deep, and of any convenient size and shape, one-fourth of its contents of sulphuric acid, of sp. gr. 1.75, is placed, and to it a quantity of hot shale from the calcining heaps is added. The mixture is then so stirred as to cause the shale to absorb the acid, and fill the tank to within six inches from the top. The whole is then covered with spent shale or ashes, and allowed to stand four or five days, by which time the mass assumes a dry appearance, and the acid has become saturated with alumina. The contents of the tank are then to be removed and placed in another leaden vessel, four feet deep, and of any convenient size, provided with a false bottom of tiles, placed about six inches above the bottom of the tank, and to the prepared shale boiling-hot distilled ammoniacal gas liquor is added. The mixture is now allowed to stand one hour to allow all the sulphate of alumina in the shale to be dissolved out of the shale. The clear liquor is then run off into leaden vessels to crystallize as alum. Fresh portions of boiling ammoniacal liquor may be added two, three, or four times, and afterwards the residue may be washed with boiling water, to remove all traces of sulphate of alumina.—*Second Process.* If the first process does not yield sufficient alumina, the shale is taken after it has been exposed to the action of the sulphuric acid in the tank for twelve hours and become nearly dry, and placed in a reverberatory furnace, into which the heat from the flue of a steam-boiler or furnace is allowed to enter, the heat being regulated by means of dampers, and kept at about 200° to 212° Fah. After about eight or ten hours' exposure to this heat, the shale is ready for the extraction of the sulphate of alumina it contains by the process above mentioned.—*Third Process.* When the shale does not absorb at least half its weight of sulphuric acid, the third process is to be adopted. For this purpose a reverberatory furnace, fifty feet long, and five feet wide, is employed, containing a lead vessel of the length and width of the interior of the furnace, and of the depth of six inches. This leaden vessel is nearly filled with the calcined shale, and sulphuric acid of sp. grav. 1.75, in quantity equal to about half the weight of the shale, is then added. The heat from the fire at both ends is directed over the contents of the furnace, and after exposure to a moderate heat for eight or ten hours, the shale is removed to the tank for the extraction of the sulphate of alumina in the manner before described.

Mr. Spence having found that in manufacturing alum, according to his patent process of Nov. 27th, 1845, the mother-liquor, after crystallization of the salt, contains free sulphuric acid, adopts the following mode of treatment: He pumps this mother-liquor into leaden vessels and passes into it distilled ammoniacal gas liquor ; sulphuretted hydrogen escapes, the sulphuric acid is neutralized by the ammonia,

and sulphate of ammonia formed, which is employed in the manufacture of fresh batches of alum.

Mr. J. F. Wilson's process (dated Dec. 7, 1850) of manufacturing alum from shale is as follows:—He selects shale as free as possible from impurities, and after exposing it for two or three months to the action of the atmosphere, by which it breaks down and assumes a pulverulent form, he roasts it in a lime-kiln of the ordinary construction, in which continued removals of roasted shale are effected below, and continued additions of raw shale are made in the upper part of the kiln, care being taken not to submit the shale to a red heat, lest its particles become so aggregated as to interfere with the due action of the acid in the next operation. To extract the alumina he uses a wrought iron vessel or open boiler, either round or oblong, about five feet wide, four feet deep, and fifteen feet long, the interior of which is smooth, and lined with stout lead. At a distance of about fifteen or eighteen inches from the bottom of this vessel he places a false bottom made of lead, of the stoutness of twenty-four pounds to the square foot, and perforated with numerous holes, a quarter of an inch in diameter. This false bottom is supported by means of cross bars of iron coated with lead, resting on the curved sides of the vessel; a part of this false bottom, to the extent of about eighteen inches, being made moveable, so as to allow of the ready inspection or cleaning of the lower part. The vessel is placed in a furnace so constructed that the flame of the fire cannot reach to the false bottom by several inches. Into the vessel or boiler so arranged, 12 cwts. of the prepared shale is placed (the larger pieces resting on the perforated false bottom) and on it is poured 10 cwts. of sulphuric acid, sp. gr. 1.845, after which a sufficient quantity of water is added as is found requisite to reduce the sp. gr. of the acid to 1.35 or 1.40, and fill the boiler to within six or eight inches of the top; moderate ebullition is then maintained for about forty-eight hours, water being added from time to time to make up the loss from evaporation. At the expiration of about forty-eight hours the whole of the alumina will be found to be extracted from the shale. The fire is then withdrawn and the liquor run out, the small quantity of sulphate of alumina remaining attached to the residuary shale being readily removed by washing, either with the liquor from the rocking tubs or with water. The washings are mixed with the strong liquor previously obtained, which is thus reduced to a proper degree for crystallizing. The relative proportions of prepared shale and acid employed, will of course depend upon the quantity of alumina contained in the shale, which must be ascertained by experiment. Any arrangement of apparatus will do, provided that the false bottom is so placed as to permit of the safe application of sufficient heat, and the thorough drainage of the shale.

The sulphate of alumina obtained in the way above mentioned, may now be converted into alum, by the addition to it of sulphate of potash or sulphate of ammonia, in the usual way; but Mr. Wilson has found in practice, that when alumina is extracted from shale and aluminous earths, by direct combination with sulphuric acid, a large quantity of this acid always remains in excess in the mother-liquor after the alum has crystallized, and is ultimately lost; he therefore runs the solution of sulphate of alumina and the washings together into a very large vessel, lined with lead, and heated by steam or other means, and of a dimension capable of holding a much larger quantity of liquor, and adds some ammoniacal liquor as obtained from the gas-works or other sources, or condenses the vapour of distilled ammoniacal liquor into it, or adds distilled ammoniacal liquor in sufficient quantity to neutralize the excess of acid, whereby a solution of alum is obtained free from all excess of acid. If too much ammonia be added, a brown powder not readily soluble is precipitated; and if a sufficient quantity has not been added, a portion of sulphate of ammonia may be employed to make good the deficiency. The solution of alum thus obtained is crystallized in the usual way.

Dr. Richardson's improvements, dated Jan. 26, 1850, in the manufacture of alum, are as follows:—In lixiviating the calcined shale for obtaining the raw alum liquor, he employs an arrangement of pits, furnished with pipes, for the purpose of conveying water or liquor from one to the other: the aluminous solution in one pit is thus conveyed to a fresh supply of shale in another, and so on throughout the series, until it has acquired a density of about 28° Twaddle, when it is drawn off for further use. This arrangement of apparatus is intended to save the trouble and expense of pumping the liquor from one pit to the other; the process of exhaustion is more conveniently performed, and a more complete exhaustion of the alumina of the shale effected than is usually obtained.

Mr. Strahan's process (date June 12, 1828) for manufacturing alum is as follows:—He takes a quantity of aluminous clay or earth, or other substance containing alumina, as white and as free from iron as possible, and also as clear from gravel and other contaminating matter as is to be had (the light-grey coloured clay shale found among the coal mines answers the purpose extremely well), and reduces it to an even degree of fineness, and throws about 30 cwt. into a reverberatory furnace. The fire is kept at a moderate heat until the aluminous earth is dry, when he proceeds to throw in at intervals from four to five cwt. of crystallized sulphate of iron, or its equivalent of solution, stirring the mass well with rakes. The fire is then urged higher, the raking being continued, adding from time to time water, when the crystallized sulphate is used, until the impregnated clay, earth, or other aluminous matter is quite dry, and so calcined, as that the iron which was contained in the sulphate of iron is so far oxidized as to have become insoluble. When this is effected, which may be known by the mass having assumed a highly-reddish colour, it is raked out of the furnace into stone cisterns and covered with water. After remaining for two or three days, being stirred and plunged up frequently, the solution is let off into the receiving cistern, and is now ready for evaporation. Instead, however, of immediately running this liquid sulphate of alumina into the evaporator, Mr. Strahan prefers that, in case the strength should be less than 15 per cent. above water, that the liquor should be returned over freshly impregnated matter until it has attained that strength.

The boiler used for evaporation, and which is found very effective, is an arched chamber, twenty-two feet long, seven feet broad, and three feet deep from the spring of the arch, formed of stone, and arched with brick, having at one end a fireplace, extending the whole breadth, separated from the body of the chamber by a water-tight bridge or mid-feather. This boiler-chamber or cistern being filled with the liquid sulphate of alumina to within a few inches of the top of the bridge or mid-feather, the flame or heat radiates down from the arch, and sweeps over the whole surface of the liquor, taking the steam produced with it up the chimney in a continued stream, the evaporator being supplied with fresh liquor as the water is thrown off. During the concentration, the alkali is to be added. This may be either muriate of potash, sulphate of potash, potash itself, or any other salt usually employed by alum makers. It is best to allow the evaporation to proceed until the liquor is concentrated to from 30 to 33 per cent. above water, before adding the alkali, the proportion of which will be the same as commonly used by alum-makers, and must, of course, depend on the quality of the alkaline salts used. When the alkali has been added, the concentration is to be carried on till the liquor has attained the strength of from 35 to 38 per cent. above water; it is then to be let or drawn off into coolers for crystallization. At the end of about ten days, the mothers may be drawn off, when the alum will be found in crystals in the cooler. These crystals are to be washed, re-dissolved in clean water, and again crystallized.

It is now pure alum and fit for all uses to which alum can be applied, but as alum is generally sold in large masses (the process of forming which is called "rocking"), it may for this purpose be again dissolved in as small a quantity of water as will at the greatest degree of heat which can be communicated to it take up in solution, and run it into casks or tubs so constructed, as to be easily taken to pieces and again set up; in these it should remain from ten to fourteen days, when the mother-liquors may be let off, the casks taken to pieces, and the alum broken or cut up into pieces for sale.

(*To be continued.*)

APPARATUS INTENDED TO SUPERSEDE THE WOOLF'S BOTTLES FOR OPERATIONS WITH GASES.

The inconvenience attaching to the use of a series of Woolf's bottles—their cost, the trouble of making connexions, and the destruction of corks, &c.—are as well known as its advantages for the solution of gases, &c. An arrangement has been contrived by M. Letoret, of Brussels, in which the connexion is effected by a water-joint; it may, therefore, be found very serviceable for such purposes. It consists of three glass cylinders, of which the accompanying diagrams represent vertical sections.

FIG. 1.

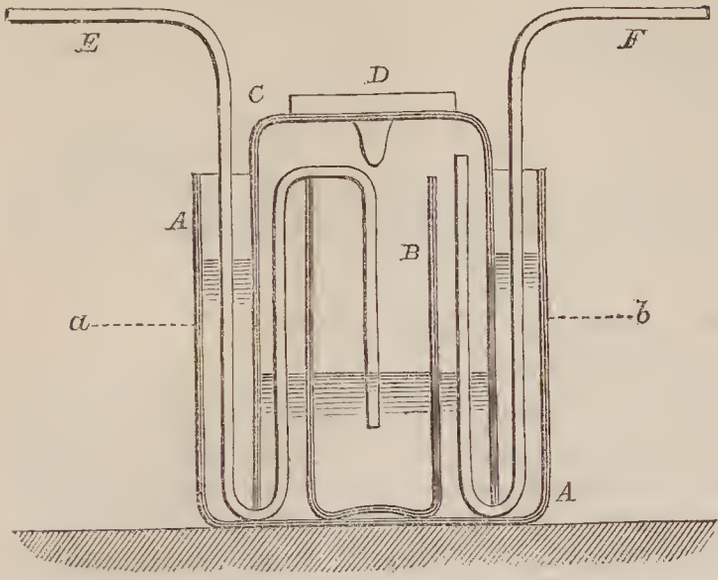


FIG. 2.

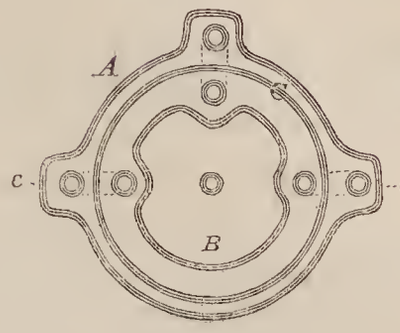
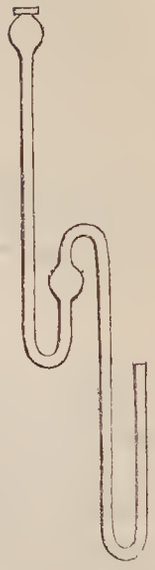


FIG. 3.



The outer and inner cylinders, *A* and *B*, have each three grooves perpendicular to their base and at corresponding points of their circumference, but in opposite directions. The intermediate cylinder *C* is plain, and is inserted within *A*, over *B*.

The liquid used to shut off communication with the exterior air is placed in the outer cylinder, and the liquid to be brought in contact with the gas is placed in the inner vessel. The gas is conducted into *B* by the bent tube *E*, and the unabsorbed portion escapes by the tube *F*. Both these tubes fit in the pairs of opposite grooves; the third pair of grooves is for a safety tube, fig. 3, if requisite. The mode of connecting a series of these vessels will be sufficiently evident from the wood-cut. This arrangement may likewise be employed for generating gases as shown in figs. 4 and 5.

The liquid used for the hydraulic joint must be adapted to the nature of the operation. In the preparation of carbonic acid or the bicarbonates water will answer. For other purposes mercury, solutions of chloride of calcium, of caustic alkali, &c., may be used.

The cylinder, *C*, must be loaded with a sheet of lead in order to keep it steady.

FIG. 4.

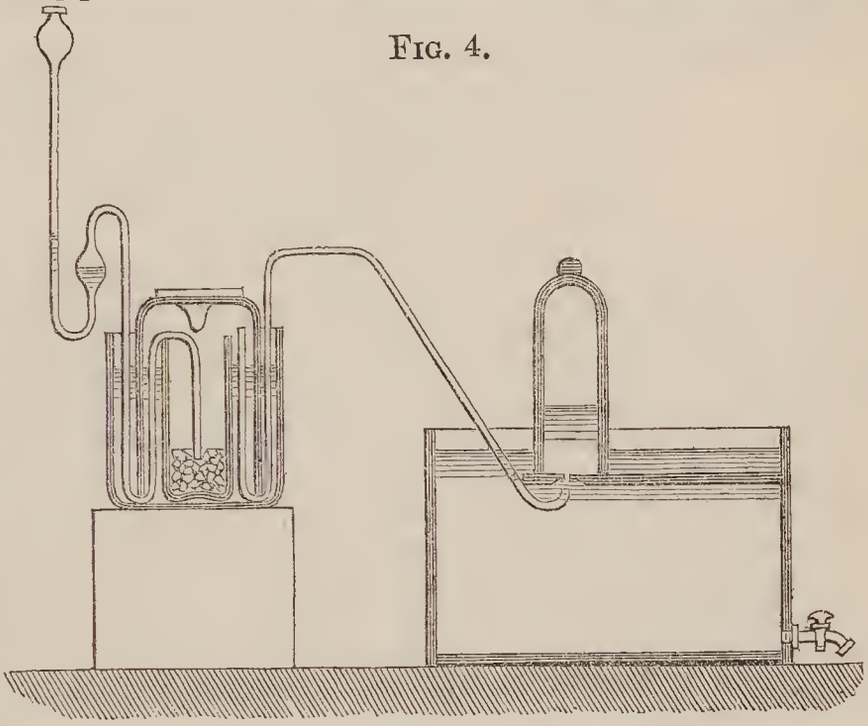
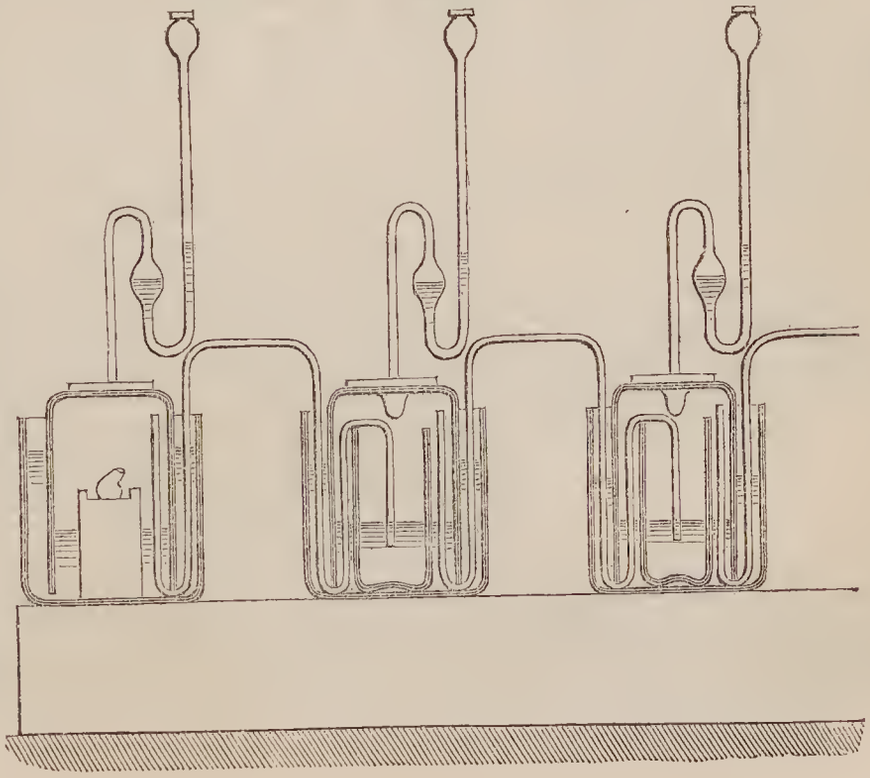


FIG. 5.



ESSENCE FOR PRESTON SALTS (MOUNSEY'S).

℞ Ol. Caryoph. Ver., ʒj.
Ol. Lavendula, Ang., ʒij.
Ess. Bergamot., ʒv.
Liq. Ammon. Fortiss, s. gr. 880, Oj. M. ft. Essentia.

The bottles to be half filled with rough carbonate of ammonia, and filled up with carbonate of ammonia in fine powder, and then as much of the essence as the ammonia will absorb added.

SYRUPUS FERRI PHOSPHATIS COMPOSITUS.

BY THOMAS S. WIEGAND.

Within about twelve months, the attention of the pharmaceutists of this city has been directed to the phosphatic salts of iron, lime, potassa and soda, by the numerous prescriptions of some of our physicians for combinations of two, three, or all of them, in pills, mixtures, or syrups. In volume xxv., page 411, of this Journal, Mr. A. B. Durand published a formula for syrup of phosphate of lime.* Since then, a phosphatic syrup, embracing in its composition the phosphates of iron, lime, potash and soda, has been introduced to notice by several apothecaries; and as the formula has not as yet transpired, the following recipe for an analogous preparation, may be acceptable to many of the readers of the Journal:—

Take of Protosulphate of iron, four drachms and two scruples.
Phosphate of soda (crystallized), seven drachms and a half.
Phosphate of lime (recently precipitated), four drachms.
Glacial phosphoric acid, one ounce.
Sugar, in coarse powder, eight ounces.
Water a sufficient quantity.

Dissolve the sulphate of iron, and five and a half drachms of the phosphate of soda severally, in three fluid ounces of the water, and mix the solutions. Wash the precipitated phosphate of iron with (cold) boiled water, mix it with the phosphate of lime and half a pint of water in a porcelain capsule, apply heat, gradually add the phosphoric acid, continuing the heat until a clear solution is obtained, and dissolve in it seven ounces (troy) of the sugar. Then dissolve two drachms of the phosphate of soda, and an ounce of sugar, in a fluid ounce of water, acidulate the solution with phosphoric acid, and add it to the syrupy solution first obtained. A slight cloudiness is occasioned by mixing the solutions, which may be entirely removed, and the syrup rendered permanently transparent by adding forty drops of hydrochloric acid.

Each teaspoonful of this syrup contains about one and two-fifths gr. of protophosphate of iron, two-and-a-half grains of phosphate of lime, one and one-fifth gr. phosphate of soda, and four-and-a-half grains of free phosphoric acid, which may be considered the dose.

The preparations now in use are coloured with cochineal and flavoured with orange peel, which render them less disagreeable. The syrup now offered may be so treated by rubbing up six grains of cochineal with a little sugar, and adding ten drops of the oil of orange peel and adding the mixture to the syrup and filtering.—*American Journal of Pharmacy.*

ADDITIONAL REMARKS ON THE PHARMACY OF THE PHOSPHATES.

BY WILLIAM PROCTER, JUN.

There are several ways in which phosphate of iron and other phosphates may be prescribed extemporaneously in solution, and the proportions varied to suit particular cases. The therapeutic results from the use of so much free phosphoric acid

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* Take of precipitated phosphate of lime, 128 grains.
Glacial phosphoric acid, 240 grains.
Sugar, in coarse powder, 7½ oz. (Troy).
Distilled water, 4 fluid ounces.
Essence of lemon, 12 drops.

Mix the phosphate of lime with the water, in a porcelain capsule, over a spirit or gas lamp, or in a sand-bath; add gradually the phosphoric acid until the whole of the phosphate of lime is dissolved. To this solution add sufficient water to compensate for the evaporation; then dissolve the sugar, by a very gentle heat, and, when perfectly cold, add the essence of lemon.

have hardly yet been fully investigated; and it is worthy the attention of physicians who prescribe the phosphates in this manner, to observe the relative effects of treatment by phosphatic mixtures, with and without the free acid; more especially in reference to the excretions.

The following recipe will yield an acid solution of the phosphates of protoxide of iron and soda, viz.:—

Take Protosulphate of iron (cryst.), a drachm.
Phosphate of soda (cryst.), two drachms.
Glacial phosphoric acid, two scruples.
Syrup of orange-peel, two fluid ounces.
Water, two fluid ounces.

Triturate the salts with the acid in a Wedgewood mortar until a syrupy liquid is produced by their reaction, then gradually add the water, filter the solution through a piece of lint, or muslin, and mix it with the syrup. Of this mixture the dose may be a dessert spoonful, or a table spoonful, according to circumstances.

The reactions that occur when the solid ingredients are triturated together, are the production of phosphate of iron aad sulphate of soda, and the solution of the former by the free phosphoric acid, the liquefaction arising from the water of crystallization of the salts, both of which are strongly hydrated. The presence of the small amount of sulphatc of soda formed may be looked upon as unimportant, yet it would be more appropriate to employ the proto-chloride of iron as in the following formula, when the resultant would be common salt instead of sulphate of soda:—

Take of Protochloride of iron (in crystals), ℥j.
Chloride of calcium (fused), ℥iss.
Phosphate of soda (crystallized), ℥vij.
Phosphate of Potassa, ℥j.
Glacial phosphoric acid, ℥iij.
Syrup of lemons,
Distilled water, of each four fluid ounces.

Triturate the chlorides of iron and calcium, six drachms of the phosphate of soda, and the phosphoric acid, together with a little water, until a homogeneous liquid is obtained, and then add the rest of the water gradually. Dissolve the phosphate of potassa and the remainder of thc phosphate of soda in the syrup, and add it to the first solution, and mix.

The result is a syrupy, acid, saline liquid, holding a portion of gelatinous phosphate of lime in suspension. This may be entirely dissolved by using more phosphoric acid, or by adding a little hydrochloric acid, as suggested by Mr. Wiegand.

The reactions that occur in the above formula, are, first, the production of phosphate of lime, phosphate of iron, and chloride of sodium; next, tlie immediate solution of the two first through the agency of the free phosphoric acid. When the syrup containing the phosphates of soda and potassa is added, a portion of the free acid is attracted by them, and a small part of thc phosphate of lime is precipitated in a hydrated form.

Sulphate of iron may be substituted for the chloride in the above formula by first triturating the soda salt and chloride of calcium alone with a little water, till double decomposition ensues, then adding the *sulphate* of iron and again triturating, and lastly the phosphoric acid. By observing this order no sulphate of lime is formed, and the mixed hydrated phosphates of lime and iron at first formed are readily dissolved by the free acid. When sulphate of iron is used, of course both sulphate of soda and chloride of sodium exist in the preparation.

The phosphates of iron and lime of commerce are often so granular and dense that their solution and absorption in passing along the alimentary canal must be much interfered with. This difficulty may be avoided, when the free phosphoric acid is objectionable, by presenting thc insoluble phosphates in a hydrated form, thus :—

Take of Protosulphate of iron, (cryst.), ℥ij.
Chloridc of calcium (fused), ℥iss.
Phosphate of soda (cryst.), ℥vij.
Syrup of ginger,
Distilled water, of each four fluid ounces.

Triturate tlie chloride of calcium with the phosphate of soda and three fluid ounces of the water, till the decomposition is complete, and a smooth mixture is obtained;

then add the syrup ; and finally the sulphate of iron previously dissolved in a fluid ounce of the water.

The resulting mixture consists of the hydrated phosphates of iron and lime, with about two drachms of sulphate of soda and a little common salt, the whole rendered palatable by the syrup, which also tends to suspend the insoluble salts, and to prevent the peroxidation of the iron salt.

These formulæ are offered, not as regular preparations, to be kept prepared ; but as conveying some hints as to a manner of preparing the phosphates extemporaneously for administration in solution or mixture, very favourable to their therapeutic action.—*American Journal of Pharmacy.*

HOW FAMILIES ARE POISONED.—SCHEELE'S GREEN IN BAKERS' SHOPS.

(To the Editor of the Pharmaceutical Journal.)

Sir,—The fact which I am about to mention shows in what an insidious manner arsenic may be introduced into articles of food supplied to a family. Cases now and then occur to a Medical Practitioner in which certain symptoms, strongly indicative of irritant poisoning, appear simultaneously in several members of a family. No source of poisoning can be discovered, no motive may exist for its administration ; the persons affected recover, and the matter is forgotten. In another and more serious class of cases, several members of a family die suddenly, one after another. Poison is suspected to have been the cause of death, and traces of it may be actually found in the body ; but it will be impossible to discover how or when it entered the body. In a case which I was required to investigate in January last, the father, mother, and three children were carried off within the short period of about ten days ; as it was supposed, by disease. The body of the mother was exhumed a month after interment, and arsenic was found in the liver. This created a strong suspicion that all had died from poison ; but the most minute inquiry has failed to show how or in what way the arsenic could have entered the body of the mother. Nevertheless, it was quite clear that she must have taken it during life, as it had been absorbed, and was found deposited in the liver.

On the 17th of the present month, when about to cut the loaf on my table for breakfast, I observed some green patches and streaks over the partially burnt under-crust. The appearance was something like that caused by green mould; but, on examining the slices of toast in the toast-rack, I found similar green spots in the depressed portions of the crust of the toast. I then examined the green spots with a lens, and subsequently a portion was scraped off, and examined under a microscope of low power. The coloured particles then resolved themselves into a mineral powder, having all the appearances of Scheele's green, or arsenite of copper. I scraped from the bottom of one loaf from one and a-half to two grains of this powder ; and, on applying Reinsch's process, I separated a quantity of metallic arsenic sufficient to coat two square inches of copper. The metallic arsenic was converted to crystallized white arsenic, and examined under a high magnifying power, when the arsenious acid was plainly perceptible. The green substance adhering to the crust of the bread and toast, was therefore proved to be Scheele's green, a pigment which contains about 50 per cent. of white arsenic.

On inquiring of the servants, I found that five loaves had, the day before, been taken from the baker, a respectable tradesman, with whom I have dealt for twelve years. On examining these loaves, three of them were stained in the under-crust with closely adherent patches of the green arsenite of copper. It appeared clear from the circumstances, that there had been no intentional admixture of poison, or this would have been found inside and not on the outside of the bread. It was quite certain that the loaves must have been delivered with the poison adhering to them, because there is no green paint in the house.

Thinking that some accident might occur in other families, I immediately went to the baker, and showed him the Scheele's green and metallic arsenic extracted from it. On entering his shop, I at once saw the cause of the poisoning of the bread. He had had his shop newly-decorated, and there were eight long shelves (holding some hundreds of loaves) painted of a bright grass-green colour, top, front, and sides. They had been evidently very substantially coated with the green paint. The warm loaves, placed on the recently painted shelves, had imbibed a quantity of the

poisonous pigment, which had dried in the under-crust. He took down five or six loaves in succession, and all were found stained with the arsenite of copper. The baker assured me that he had not the least idea there was arsenic in the green paint; but the painter, who was summoned, took the matter more coolly and professionally, remarking that it was impossible to get a good green without arsenic, that he had used it for many years, and had never heard of any one being killed by it. Although he knew the shelves were for the purpose of storing loaves of bread, he was evidently waiting for some fatal cases in his own experience before he could make up his mind to lay aside the practice of using this paint.

The baker, at my strong request, had the whole of the loaves rasped, and, without loss of time, the tops of the shelves were planed off, so that the loaves should rest upon nothing but plain and unpainted deal. There was enough on the crust of one of the loaves to have killed an infant; and I can suppose a case in which a nursemaid, about to quit a service for misconduct, might be seriously implicated by such an occurrence as this, unless the cause were at once traced.

In foreign countries there are strong restrictions placed on the sale and use of this noxious pigment. In England, however, green sweetmeats are actually coloured with it; and lemon, acid, and other drops, are sometimes sold, wrapped in paper coarsely tinged or dyed green with this dangerous compound of arsenic.

I am, &c.,

ALFRED S. TAYLOR, M.D., F.R.S.,
Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital.

15, *St. James's Terrace, Regent's Park, March* 29, 1854.

THE POISON OF THE RATTLESNAKE.

A PAPER was lately read before the Boston Society of Natural History, from Dr. W. J. Burnett, on the character of the rattlesnake. The Doctor had been experimenting on two or three specimens of this animal, and announces the discovery of numerous embryo fangs in the jaws of the snake, immediately behind the outward fangs. The use of these hidden weapons of destruction appears to be to supply the place of the biting fangs of the serpent when they get broken off or worn out in service. It also appears that the long fangs (two in number), which are used in inflicting the deadly bite of the rattlesnake, are naturally shed every few years, when they are not injured by accident or wear, and the reserve fangs are sufficiently numerous to meet the worst emergencies. From minute microscopic examination of the structure of these teeth, Dr. B. concludes that there are two canals in each fang, only one of which conveys the poison to the wound. Respecting the character of the poison itself, the Doctor remarks as follows:—

"There is good reason for the belief that its action is the same upon all living things, vegetables as well as animals. It is even just as fatal to the snake itself as to other animals; for Dr. Dearing informed me that one of his specimens, after being irritated and annoyed in its cage in moving suddenly, accidently struck one of its fangs into its own body; it soon rolled over and died, as any other animal would have done. Here then we have the remarkable, and perhaps unique philosophical fact, of a liquid secreted directly from the blood, which proves deadly when introduced into the very source (the blood) from which it was derived!"

In order to scrutinize by the aid of the microscope, the operation of this deadly agent on the blood, Dr. Burnett stupified one of the fiercest of his snakes by dropping chloroform on his head:—

"Twenty-five or thirty drops being allowed to fall on his head, one slowly after the other, the sound of his rattle gradually died away, and in a few minutes he was wholly under this agent. He was then adroitly seized behind the jaws with the thumb and forefinger, and dragged from the cage, and allowed partially to resuscitate; in this state a second person held his tail to prevent his coiling around the arm of the first, while a third opened his mouth, with a pair of forceps, pressed the fang upward, causing a flow of poison, which was received on the end of the scalpel. The snake was then returned into the cage.

"Blood was then extracted from a finger for a close microscopical examination. The smallest quantity of poison being presented to the blood between the glasses, a change was immediately perceived—the corpuscles ceased to run and pile together, and remained stagnant without any special alteration of structure. The whole

appearance was as though the vitality of the blood had been suddenly destroyed exactly as in death from lightning. This agrees also with another experiment performed on a fowl, where the whole mass of the blood appeared quite liquid and having but little constitutable power."

Dr. Burnett is of the opinion that the physiological action of the poison of the rattlesnake in animals is that of a most powerful sedative, acting through the blood on the nervous centres. He supports this position by the remarkable fact that its full and complete antidotes are the most active stimulants; and of these, alcohol (commonly in the form of rum or whisky) is the first. The remedy is well known in the south, and there are some twenty-five authentic cases on record proving that a person suffering from the bite of a rattlesnake may drink from one to two quarts of clear brandy without feeling the slightest tendency to intoxication, and eventually recover.—*Hartford Times.*

SPONTANEOUS GENERATION OF PRUSSIC ACID IN A MEDICAL COMPOUND.

BY JOHN T. PLUMBER, M.D., OF RICHMOND, INDIANA.

I DO not know that the attention of the medical profession has heretofore been called to the fact that alkaline combinations with organic matters, at least sometimes generate *hydrocyanic acid.* Nor did it present itself to my own mind until recently. I think it should claim the notice of those who are interested in the treatment of disease, as well as of those who are engaged in Pharmaceutical Chemistry.

The short train of events leading to the development of this fact was as follows:—

A young physician applied to me on account of an attack of sickness the day before, for which he could assign no satisfactory reason. He said that while he was engaged in reading, he suddenly became unconscious, and remained so for half an hour, according to the statement of his wife. After he revived sufficiently to walk about, he said be felt half bewildered, and found that his powers of recollection were greatly impaired, if, indeed, they were not sometimes entirely gone.

He could not attribute it to anything inhibited, unless it was a preparation of carbonate of potash and tincture of hyoscyamus which a distinguished Eastern physician had prescribed for him, and which he had repeatedly taken before, without any ill effect.

As the patient belonged to the class of dyspeptics, I was at first inclined to attribute his attack to some ordinary gastric derangement displaying itself upon the nervous system; but on further reflection and consultation with him, I learned that the preparation of which he took the dose in question (a teaspoonful), was one that he had made some time before and laid aside.

This consideration induced me to make a chemical examination of the contents of the vial. At the bottom of the vessel there was a copious, pure white, delicate deposit; the supernatant fluid was clear, and had a suspicious odour, which led me to test for prussic acid. There was a perceptible fermentation going on in the liquid.

The white sediment was collected on a filter, washed, and subjected to the action of acids, and also to the red heat of a platinum spoon. But none of these agents produced any sensible impression upon it. I then exposed it to the heat of a blow-pipe flame, with carbonate of soda, and obtained, what I anticipated,—silicate of soda. The *silica* was probably derived as an impurity from the carbonate of potash, which entered into the composition of the medicine.

The filtrate was received into a wide-mouthed vial; and the mouth covered with a slip of glass moistened on the under side with nitrate of silver in solution. In a short time the solution was observed to become opaque and white. This white film was treated with NO_5, without effect; but cyanide of potassium immediately dissolved it.

The mouth of the vial was now covered with another piece of glass moistened with NH_4 S, HS. After some minutes the glass was removed, and the moisture, now milky, gently evaporated. To the dried residue a solution of a persulphate of iron was applied by means of a glass rod drawn over the surface. The modena red streaks which appeared, confirmed the former results with AgO, NO_5, and left no doubt of the presence of *hydrocyanic acid.*

As further evidence, however, of the existence of HCy in the fluid, I added to the

filtrate (about an ounce of it) solution of AgO, NO_5, till all precipitation ceased. The precipitate was collected and washed; and NO_5 added. By this means the carbonate of silver, &c., were removed. The undissolved residue was washed, and was found to be soluble in cyanide of potassium; and to be decomposed by HCl with liberation of the prussic acid odour.

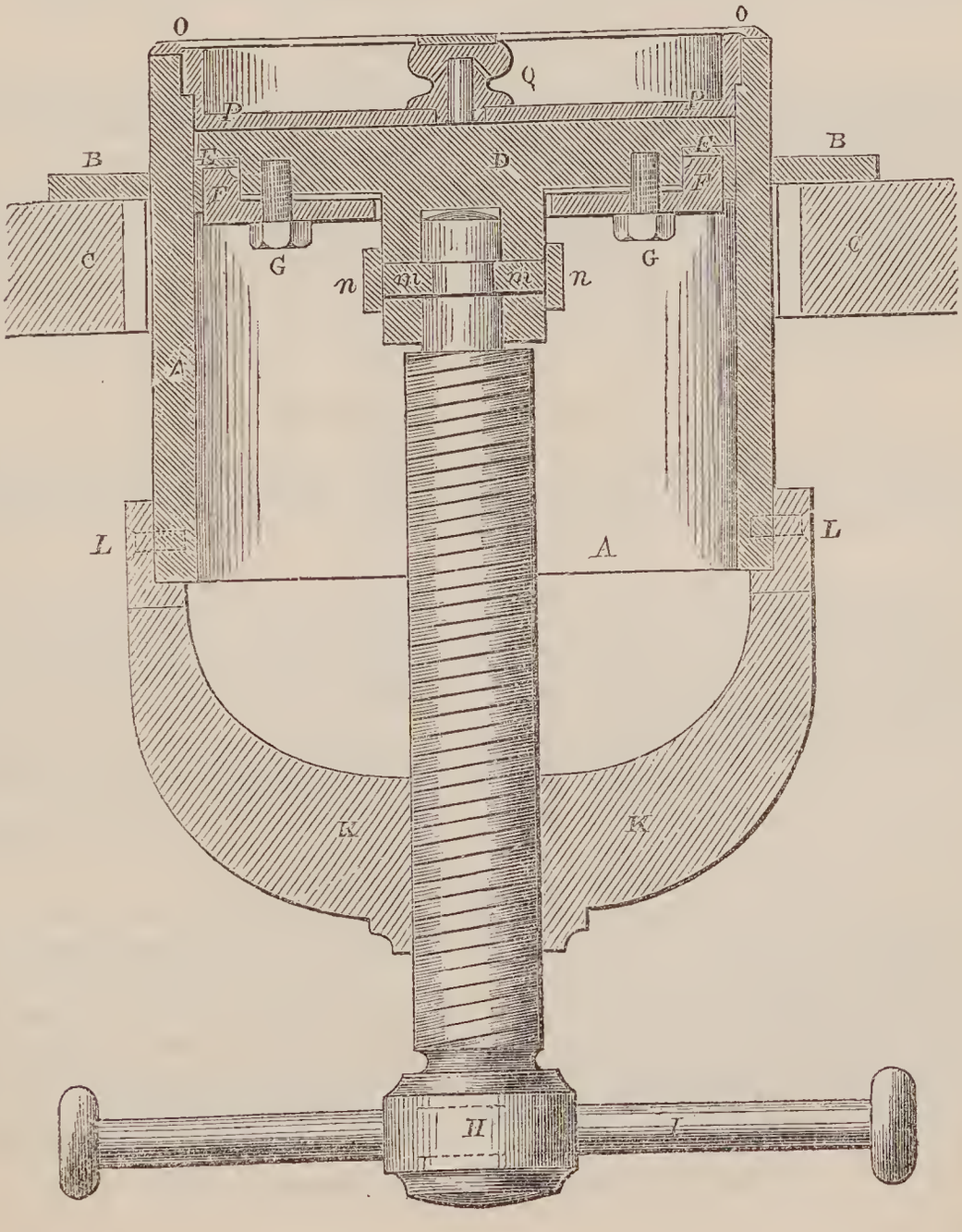
This was the extent of my analysis. The reader must judge for himself whether I found sufficient cause for the alarming symptoms manifested by the patient. He took no more of the medicine. More than a month has elapsed since the attack, and there has been no return of the symptoms.

Judging from the presence of HCy in the fumes over the soap kettle, and in the odour of *crude* potash, I suspect it will be found, that with moisture, potash and carbonate of potash by their reaction on organic matter, generally generate this dangerous remedial agent.—*American Journal of Pharmacy.*

APPARATUS FOR HOLDING GLASS PLATES WHILE BEING CLEANED FOR USE IN PHOTOGRAPHY.

The frames hitherto employed for this purpose are objectionable, because they prevent the whole surface of the glass from being uniformly cleaned, and when the plates are in the least degree moveable, the underneath surface becomes scratched.

To obviate these inconveniences, M. Albert has constructed an apparatus for fastening the glass plates by means of atmospheric pressure. The accompanying cut represents it in vertical section, one-half the actual size. It consists of a brass cylinder *A*, with a broad projecting rim *B*, at about one-inch from its upper end.



This rim rests upon the upper surface of a table, to which it is fastened by screws. The cylinder is furnished with a piston *D*, the stuffing of which consists simply of a disc of leather *E*, pressed against the piston by a cap *F*, fastened to the piston by six screws *G*. The piston is moved by means of a screw *H*, working through the bow *K*, resting upon the lower edge of the cylinder, and screwed to it. In order that the piston may receive only the direct motion of the screw, the latter is furnished at its upper end with a neck, into which fit two steel plates *m*, which are slipped into their place laterally through the fillet of the piston, and together entirely surround the neck. These plates are fixed by means of a ring *n*, slipped over the fillet of the piston, and fastened by two small screws. As the glass plate must fit air-tight upon the upper edge of the cylinder, without the aid of any cement or grease, a circular shallow groove is turned in the upper surface of the cylinder, into which is placed a ring *O*, of vulcanized caoutchouc. This renders the connexion of the glass plate perfectly air-tight, even when it is not quite flat.

In order to prevent injury to the apparatus from the breaking of plates, which sometimes happens, a cover *P* is employed, which fits into the top of the cylinder above the piston. In its centre is a knob *Q*, with a disc of caoutchouc exactly in the same plane as the ring *O*, which serves as a support for the glass plate, and lessens the danger of breakage. An air channel passes through the centre of this knob, and communicates with two smaller ones, so that in case of breakage, the splinters of glass fall into the cover *P*, without getting into the apparatus.—Dinglers' *Polytechnische Journal*, July, 1853.

PREPARATION OF OXIDE OF ZINC FREE FROM IRON.

BY H. GRUNEBERG.

The separation of iron from zinc solutions has hitherto been effected either by long digestion with metallic zinc or by peroxidizing the iron with chlorine and then precipitating with soda. Both methods are tedious and troublesome.

The author employs for this purpose hypochlorite of soda, obtained by treating hypochlorite of lime with soda. The reaction is the same as in the treatment with chlorine. The hypochlorite solution is added to the zinc solution until a portion of the liquid treated with soda and filtered gives no further iron reaction.—*Journal für Praktische Chemie.*

PREPARATION OF PURE CAUSTIC POTASH.

Wöhler* has adopted a very elegant method for the preparation of this substance.

When nitrate of potash is heated to redness, with metallic copper, the nitric acid is completely decomposed, and there remains a mixture of caustic potash and oxide of copper.

The copper is best in the form of sheet-clippings, two or three parts, to one of nitrate. The fusion may be made in an iron crucible, but as the same reaction takes place between iron and the nitrate, traces of carbonic acid and silica are then introduced into the potash. A copper crucible is far preferable, and with it the potash may be obtained chemically pure.

The copper-clippings and nitrate are placed in alternate layers in the crucible, which is covered and heated to moderate redness for half-an-hour. When cold the mass is treated with water, the solution poured into a narrow cylindrical vessel, the mouth of which can be closed, by a ground glass plate, and when perfectly clear drawn off by a syphon. Not a trace of copper is dissolved.

When the above proportions of copper and nitrate are used, part of the copper is only converted into suboxide, which may be used again for the same purpose, with a smaller quantity of copper.

This reaction, besides being very valuable for the preparation of pure potash, would, most probably, furnish a ready and accurate means of estimating the value of commercial nitres, a weighed quantity being ignited with copper, and the amount of alkali ascertained by a volumetrical experiment with a normal acid.

* *Annalen der Chemie und Pharmacie, September*, 1853.

PREPARATION OF A DOUBLE SALT CONTAINING PROTOXIDE OF IRON.

The Austrian Pharmaceutical Journal contains an anonymous paper on this subject, in which it is stated that the white carbonate of iron precipitated from a solution of protochloride of iron re-dissolved by the addition of dilute nitric acid, gives a colourless liquid, which may be kept without oxidation, even in an open flask, and when evaporated, yields a nearly colourless double salt, which deliquesces in a moist atmosphere, but is not oxidized.

On account of the hygroscopic character of this salt, the author recommends that the solution should be used for medicinal purposes, and prepared as follows:—

Clean iron wire is dissolved in an ounce of hydrochloric acid of 1.110 sp. gr., the green solution treated with enough carbonate of soda to precipitate all the iron, and dilute nitric acid added, until the precipitate is re-dissolved. This liquid is diluted with distilled water, until the total weight is six ounces; one ounce, therefore, contains 12.5 grains of iron.

A solution of proto sulphate of iron precipitated by carbonate of soda and the precipitate re-dissolved in dilute sulphuric acid, likewise gives an almost colourless liquid, which yields, on evaporation, crystals that are not oxidized by exposure to air. He considers that this salt might be advantageously substituted for sulphate of iron in medicine.

It is probable that the first mentioned compound contains proto-nitrate of iron, which has been observed by Berzelius to possess a certain degree of stability.

OXIDIZED SILVER.

The high appreciation in which ornaments in oxidized silver are now held, render a notice of the process followed interesting. There are two distinct shades in use, one produced by chlorine, which has a brownish tint, and the other by sulphur, which has a bluish-black tint. To produce the former, it is only necessary to wash the article with a solution of sal-ammoniac; a much more beautiful tint may, however, be obtained by employing a solution composed of equal parts of sulphate of copper and sal-ammoniac in vinegar. The fine black tint may be produced by a slightly warm solution of sulphuret of potassium or sodium.—*Chem. Techn. Mittheilungen von Dr. Ellsner, Berlin*, 1853, and *Journal of Industrial Progress*, April, 1854.

INFLUENCE OF PRESSURE ON THE PERMANENCE OF CHEMICAL COMPOUNDS.

BY PROFESSOR WÖHLER.

The hydrate of chlorine, which, under ordinary atmospheric pressure and temperature readily decomposes, may be preserved, with but little alteration, even at a summer temperature, when enclosed in sealed tubes, where it is exposed to the pressure of the chlorine disengaged by the decomposition of a portion of it. When such a tube is immersed in water at 86° or 104° F. the hydrate is decomposed; but is partially reproduced when the temperature is reduced.

SILVER PLATES FOR MARKING INK.

We have received from Mr. Culleton a reply to the statements of Messrs. Clay and Abraham, in the Correspondence referred to in our last number. Mr. C. denies having sold the plates as silver, and says that he received several orders from Messrs. C. and A. after the printed directions were sent, which mentioned "electro-plates," He says, electro-silver plates answer quite as well as silver if the ink be made properly, and that the ink made by Mr. Higgs is better than Bond's, Pouting's, or Walkdon's, which latter contain too much gum.

BOOKS RECEIVED.

Archives de Physiologie de Therapeutique et D'Hygiène, *sous la direction de* M. Bouchardat. No. I., Janvier, 1854. On souscrit à Paris, chez Germer Bailliere, Libraire-Editeur, Rue de L'Ecole-de-Médecine, 17.

A Manual of Human Histology. By A. Kölliker, Professor of Anatomy and Physiology in Wurzburg. Translated and edited by George Busk, F.R.S., and Thomas Huxley, F.R.S., Vol. II. London: printed for the Sydenham Society, 1854.

TO CORRESPONDENTS.

A. P. S. (London).—*Phosphorus in Pills.* Phosphorus may be reduced to a finely-divided state by placing it in a flask with rectified spirit, immersing the flask in hot water till the phosphorus is melted, then shaking briskly till cold.

M. P. S. (Truro).—By *Solut. Ammoniæ* we should understand *Liquor Ammoniæ*, P. L.

C. R. (Shaftesbury, Dorset).—Hooker's *British Flora.*

J. S. (Alford).—(1.) Abridgment of Ainsworth's *Latin Dictionary.* 12mo. By Dymock.—(2.) The Examinations. Notice should be given before the first of the month.

Discipulus.—Hoblyn's *Dictionary of Medical Terms.* 12mo. 10*s.*

J. S. (Shrewsbury).—*Acidulated Lemon Kali.*

℞ Sodæ sesquicarbonatis.
Acidi tartarici ana, ℥viij.
Sacchari albi, ℥xvj.
Olei limonis, gtt. 100. Misce s. a.

L. T. (Manchester).—*Solution for Cleaning Kid Gloves.* Add 15 drops of strongest solution of ammonia to half a pint of spirit of turpentine. This should be applied with a brush, followed with some fine pumice powder. Beasley.

A. B. (London).—(1.) *Lapis Infernalis.* Both *Potassæ Hydras* and *Argenti Nitras* have been called Lapis Infernalis, but the former is distinguished as *Lapis Infernalis Alkalinus.*—(2.) The portrait of William Allen was published in the eighth number of the fifth volume, which may be obtained through the publisher.

A. P. S. (Commercial Road).—It would be advantageous to pass the examination of the Pharmaceutical Society before going to New York in quest of a situation. We have no means of obtaining information respectiug the demand for Assistants in that locality.

A. B.—To obtain the stamped Diploma of the Society it is necessary to pass the Major Examination.

A Member (Nailsea) and several other Correspondents will find an Answer in another part of this number.

B. S. (Warrington).—*Tincture of Sumbul.* See vol. xi., pages 144 and 358. It is a stimulant, and has been given in cases of cholera.

R. K. (London) has sent us a copy of a prescription with fourteen ingredients, a strange mixture, but we think not worth publishing.

Chemicus.—(1.) If the process described be properly conducted the whole of the salt formed should dissolve in distilled water.—(2.) Cyanide of potassium cannot be prepared in the manner suggested, because it is a soluble salt.

J. P.—We do not answer questiors relating to the treatment of disease.

J. M. S.—There is no uniform rule adopted in such cases. The practice of the establishment in which you reside should be ascertained and followed.

Adolescens should apply to the Secretary, Mr. G. W. Smith.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

THE PHARMACEUTICAL JOURNAL.

VOL. XIII.—No. XII.—JUNE 1st, 1854.

THE RESULT OF THE ANNUAL MEETING.

During their year of office the Council for the time being are charged with the entire responsibility of managing the affairs of the Society. Whatever difficulties may arise they have a discretionary power to meet them in such manner as in their judgment may be most expedient. At the close of the period for which they were elected, they render an account of their stewardship, and receive the thanks or censure of their constituents, which may either be expressed in words, or indicated by votes at the ensuing election.

Under ordinary circumstances a change in the Council does not of necessity imply any reflection on the Members who are not re-elected, as it is generally considered desirable to infuse fresh blood into the Council from time to time, not only with a view of dividing the honour and responsibility of office among a larger number of Members, but also for the purpose of extending the representative principle to different localities in rotation.

The recent election was, however, an exceptional case. The Council had been impeached by one of its Members, who had brought against his colleagues in very discourteous language certain charges which, if substantiated, would have shown them to be entirely unworthy of the confidence of the Members. Passing over the minor allegations (such as imbecility, mendacity, dishonesty, &c.), which may be taken as mere "figures of speech," we need only dwell upon the serious charge of making illegal bye-laws, and, with their eyes open, wilfully contravening an Act of Parliament, which they were bound to carry out faithfully and to the letter. The Council repudiated the charge, maintaining that they had not only acted legally, but in strict accordance with the spirit and intentions of the Charter and the Act.

Upon legal proceedings being commenced the Council had before them a choice of evils. They had to consider whether it would be expedient for the sake of peace and harmony to submit to the dictation of their opponent and give up the point in dispute, or whether the importance of the position they had taken and the prospect of a decision in their favour would justify them in resisting the attack and defending the Society against the proceedings in a Court of Law. On mature deliberation and under the advice of Counsel, they decided on the latter alternative, as being *the only means* by which the Society could be preserved from serious injury and further difficulties, the extent of which could not be foreseen. The Council were strengthened in this decision by a consideration of the facts, that the bye-laws which were the subject of the dispute were necessary for the purposes contemplated by the Charter and the Act, that the

only objection which had been urged against them was founded on a legal technicality, that no practical advantage could possibly result from raising the question, and that no attempt at compromise was likely to be attended with success, as the animus and personal hostility with which the opponent had commenced and carried on his attack placed him beyond the reach of cool dispassionate argument.

The occurrence of the Annual Meeting at this stage of the proceedings afforded an opportunity of taking the sense of the Members on the comparative merits of the conduct and policy of the Council and of their opponent. The Members present could do this in the form of definite resolutions, modified as occasion might require in accordance with the facts or arguments elicited in the discussion. The absent Members, not having this advantage, could only convey their sentiments on the broad principles involved in the question, by recording their votes in favour of the parties whose conduct and policy they approved. It is on this account that the recent election must be regarded as an exceptional case. An important principle was involved in it, the late Council having been divided into two parties—twenty on one side, and one on the other—the Members were called upon to decide between the two, the rejection of either party being equivalent to a vote of censure.

The result of the election, coupled with the strong and almost unanimous feeling expressed at the meeting in favour of a determined defence of the Society against the hostile proceedings, will strengthen the hands of the Council and encourage them to persevere in the policy which has been thus sanctioned and approved. The Members having pronounced their verdict, and the source of disunity in the Council having been removed, we hope all feelings of animosity between the two parties will subside. The opponent of the Society is in a position from which we have no doubt he would be glad to be relieved if it were not too late to retrace his steps. "*Facilis est descensus averni.*" In other words, *c'est le premier pas qui coute:* and this *first step* having been taken in the name of the Queen in a Court of Law, there is no alternative but to abide the result. If the decision should be in favour of the Society the prosecutor will be liable to the payment of a heavy amount for costs; nor would he be less an object of commiseration if he should gain a victory, for in that case he would find that he had brought down upon himself the reproaches of his brethren throughout the country for having inflicted a serious injury on the Society by taking advantage of a doubt in the legal construction of the words of an Act of Parliament.

That which is done cannot be undone; but there is still a *locus penitentiæ.* When these unfortunate proceedings have come to a termination, and the turmoil of discordant feelings has been succeeded by the tranquillity of a calm, which usually follows a storm, the opponent will have an opportunity of making amends for his past conduct. If he will come forward in a friendly spirit, and display as much energy and perseverance on behalf of the Society as he has hitherto wasted in fruitless hostility, he may become a valuable Member, regain the respect and esteem of his colleagues, and learn by his own experience the distinction between FAME and NOTORIETY.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, May 3rd, 1854.

MR. PETER SQUIRE IN THE CHAIR.

Upon the minutes of the previous meeting being read, Dr. Normandy wished to correct a statement in the report which had appeared in the *Pharmaceutical Journal* of what he said upon the subject of the adulteration of bread. He had intended to say that he altogether objected to the use of chemicals in the preparation of articles of food, especially as they are very rarely pure; and he still retained a great objection to the use of alum, although he admitted that saleable bread could not be always produced from the flour of new wheat without it. He thought that chemicals ought not to be entrusted for such purposes in the hands of illiterate and uneducated persons.

DONATIONS TO THE LIBRARY AND MUSEUM.

The following donations were announced:—

Journal of the Society of Arts, four numbers, from the Society of Arts.

Journal of the Photographic Society, two numbers, from the Photographic Society.

Literary Gazette, four numbers, from the Publishers.

Specimen of Smyrna Scammony in the shell, from Mr. Daniel Hanbury.

Impure Cinnamic Acid.

Crystals of Sulphate of Soda, from Quassia (see page 642), from Mr. George Whipple.

Carnauba or Brazilian Wax, from M. L. Godefeoy.

Flowers, Fruit, Seed, and Rhizome of Canna Indica; Root, Leaves, Flowers, and Fruit of Amomum nemorosum, from Mr. E. Fleurot, of Port Louis, Mauritius.

These specimens were presented through Mr. J. C. Braithwaite, to whom they were sent accompanied by a letter, from which the following is an extract:—

"We have in this island an indigenous Cardamom, the Amomum nemorosum (Bojer, Hortus Mauritianus), commonly called here '*Longauze*' or '*Zedoaire du pays.*' The plant grows abundantly in our forests and in marshy places. It is a perennial, flowering in June and September, and attaining a height of six or eight feet. The fruit is sold in the market, but is not of much use, although some people like it for its sour taste. The pulp is sometimes used as a source of acid for making lemonade. Believing that specimens of this plant will be of some interest to you, I intend to forward them together with those of the Canna Indica, which is also a native of this place, where a good starch is obtained from it, and sold under the name of '*Tous les mois.*'"

The following communications were read:—

ON SOME DOUBLE SALTS OF IRON,
AND THE RELATION OF SIMILAR SALTS TO THE ALUMS.

BY MR. WILLIAM BASTICK.

It will be in the recollection of many Members of the Society that on a recent occasion there was a discussion as to the number and variety of double salts, properly included under the generic term *alums*. By some it was argued that only the double salts formed by the combination of persulphate of alumina, persulphate of iron, persulphate of chromium, or persulphate of manganese, with sulphate of potash, sulphate of soda or sulphate of ammonia, crystallized in octohedrons with twenty-four equivalents of water, and could therefore be regarded as alums. By others it was assumed that, besides these double salts, the term might be applied with propriety to all the combinations of the beforementioned persulphates, with the sulphates of magnesia, manganese, iron, zinc, copper, cobalt, and nickel. This assumption, although contrary to theory, has

been supported by Sir Robert Kane and others, who have described some double salts formed of these metallic and earthy sulphates, in combination with persulphate of alumina, and who have applied the term alums to these double salts because they possessed a similar constitution to the true alums, notwithstanding that their crystalline form belonged to the prismatic system. Now, I apprehend, that for any salts to come under the generic term alums, they must be isomorphous with the salt from which the genus alums derives its name, and that to be thus isomorphous it is absolutely necessary that the salts should possess the same crystalline form, and replace each other in combination without any material alteration in their crystalline structure. If these positions be true, however much the so-called alums described by Kane and others may agree in their chemical composition with the true alums, they cannot be regarded as, or termed alums, because their physical conformation and properties do not satisfy the conditions required by the isomorphous theory. With a view of ascertaining whether some of the metallic sulphates might, in combination with some other persulphate than that already experimented upon by Kane and others, form salts isomorphous with the true alums, I prepared and examined the following double salts of iron :—

Persulphate of Iron and Sulphate of Copper.—This salt was formed by adding in equivalent proportion sulphate of copper to a solution of persulphate of iron, containing an excess of acid, and evaporating the mixture until a pellicle formed on the surface, when the solution was set aside to crystallize. By these means a bluish-green salt was obtained in considerable quantity, whose crystalline form could only be clearly observed by the aid of the microscope, which proved that this salt does not crystallize in octohedrons, but in wart-like masses, consisting of prisms, and therefore is not isomorphous with the true alums. This salt very readily effloresces when exposed to the air; consequently it is difficult to be preserved, or to be correctly analysed, and this difficulty is increased because it is contaminated with free acid, which is not easily removed, as it cannot be crystallized except from a strongly acid solution. Notwithstanding these disadvantages I dried as far as possible a portion of the salt for analysis by subjecting it to repeated strong pressure, between the folds of bibulous paper. 2.9 grammes of this salt thus treated yielded sulphate of baryta =.95 gramme of anhydrous sulphuric acid, and 5.6 grammes gave .43 gramme of oxyde of copper and .87 gramme of peroxyde of iron, and its water was estimated from the loss. The following table will show these quantities reckoned in per cents., and also the calculated constitution of the salt :—

		Calculated.	Found.
Cu O	40	8.07	7.67
$Fe_2 O_3$	80	16.13	15.53
3 SO_3	160	32.26	32.76
24 HO	216	43.54	44.04
	496	100.00	100.00

It will be here seen that this salt has the same chemical constitution as the alums, namely, $Fe_2 O_3$, 3 SO_3+Cu O SO_3,+24 HO, but differs entirely in its crystalline structure—in fact, so much so, that as not to admit of its form being derivable from, or convertible into, that of the true alums.

Persulphate of Iron and Sulphate of Zinc.—This salt was prepared in exactly the same manner as the one previously described. It crystallizes in white transparent prisms, and corresponds to the double copper salt in all its characteristics; and although it was not submitted to an exact quantitative analysis, its examination left no doubt but that it has a similar constitution to that of the persulphate of iron and sulphate of copper.

Persulphate of Iron and Sulphate of Magnesia.—This salt, prepared as the other salts, crystallized in warty masses, consisting of prisms, and corresponds to them in its chemical and physical properties.

It is evident that the number of these salts may be multiplied to an almost endless extent, and it is equally evident, if we may presume to generalize upon

the facts before us, that the multiplication of these salts would serve to further prove the impropriety and inconvenience of applying the term alums to such salts, for the pseudo-alums would then greatly outnumber the true alums. It seems from the experiments of Will and Ortigosa that the number of the true alums may be increased, if it be desirable to do so, by replacing the ammonia or potash of the double sulphates of alumina, manganese, chrome, and iron, with organic bases, by which means compounds may probably be made likely to be interesting and valuable both to the physician and the pharmaceutist.

Mr. Girdwood exhibited some crystals consisting of a double sulphate of copper and zinc. They were first obtained accidentally from an electrotyping apparatus, but afterwards by the spontaneous evaporation of a mixture of the salts. He had not made a quantitative analysis of them.

The Chairman suggested that their exact composition should be determined.

ON DECOCTION OF SARSAPARILLA.

BY MR. JAMES ROBERTON.

In making an examination of the comparative value of two samples of sarsaparilla, I was somewhat surprised by an unlooked for result. Six drams of sarsaparilla was infused for twelve hours in twenty ounces of boiling water, then boiled for half an hour; the filtered decoction being evaporated yielded thirty-two grains of dry extract.

A slight examination of the residue convinced me that the root had not nearly been exhausted. The cortical part was removed, which whilst in a moist state was easily done, and this was treated as before, by infusion with the same quantity of boiling water for six hours.

I had a dark coloured, bright infusion, possessing strongly the characteristic flavour, and giving a very deep colour with a persalt of iron. This being evaporated produced forty-five grains more of dry extract. The point to which I wish to draw attention is just the practical one, of yield of extract and exhaustion of the root under certain circumstances.

I believe it has been assumed by many, that as the extract resides in the cortical portion, no necessity exists for slicing or crushing the root previous to maceration; and this appears to be the opinion formed by the compilers of the present London Pharmacopœia, for in the formula for decoction and fluid extract, no directions are given for previously slicing the sarsaparilla, which was the case with the decoction of the Pharmacopœia of 1836.

It may be said that the Pharmacopœia does not professedly give all the details of manipulation necessary for perfectly carrying out all its various processes. True; but I ask, if the experiment above described shows anything, on what ground in the formula for the compound decoction is the sassafras directed to be sliced, the guaiacum to be rasped, and the liquorice to be bruised, whilst the sarsaparilla, which I apprehend is the chief ingredient, is to be left untouched?

This appears to be another illustration of the necessarily imperfect character of a Pharmacopœia compiled without advantage being taken of that practical pharmaceutical knowledge which many of the Members of this Society are competent to afford, and which cannot be ignored if the Pharmacopœia of our day is in a fair degree to represent the extent of pharmaceutical science of the age.

111, *Oxford Street*, *Manchester*.

Mr. Whipple had come to the conclusion from long experience that no advantage resulted from bruising sarsaparilla in making the decoction; on the contrary, such a mode of proceeding promoted the extraction of a quantity of starchy matter, which was objectionable. The practice he adopted was to continue the boiling until nothing more was obtained, and then to evaporate the decoction until it acquired a certain specific gravity. Different specimens of sarsaparilla varied so much in the quantity of extract they afforded, that no other method could be adopted by which a uniform result could be ensured.

A FEW OBSERVATIONS ON THE USE OF ARGEMONE MEXICANA IN CHOLERA.

BY W. HAMILTON, M.B.

In the imperfect state of our present acquaintance with the pathology of spasmodic or Asiatic cholera, it would savour more of the spirit of charlatanism than of the modest diffidence of science to offer to the world any remedy as a specific for that mysterious malady; and even were I disposed to recommend the seeds of the Argemone Mexicana as such, I should at least wait till I had something like evidence to bring forward in support of the recommendation.

Hence, while I feel gratified at the prospect which the public spirited conduct of Mr. Bojers, of the Mauritius, affords of obtaining a fair trial of its merits in this country, I cannot but express my regret at having been so far misunderstood by that gentleman, as to be supposed to have said, what I am without any authority for asserting, that the oil of these seeds has been already and beneficially tried in Jamaica.

If Mr. Bojers will take the trouble to refer to the first notice of the Argemone, inserted in the fourth volume of the *Pharmaceutical Journal*, p. 168, he will understand what those properties are which led me to anticipate benefit from the exhibition of the oil in the incipient stages of Asiatic cholera. He will there learn, upon the authority of Dr. Affleck, an old and experienced practitioner of Jamaica, that an emulsion prepared from ʒij. of the seeds of the Argemone rubbed up with ℥viij. of water and a little sugar, in half-ounce doses every half-hour, relieved the violent pain and retching of flatulent colic after the third dose, brought on a composed sleep of two hours' duration after the fifth dose, and removed the last symptom of the complaint by a copious alvine evacuation soon after; thus manifesting the rare combination of anodyne, anti-spasmodic, hypnotic, and purgative action, which seems best calculated to meet the early symptoms of Asiatic cholera.

But the oil obtained from the seeds presents their virtues in a more concentrated and exalted degree, thirty drops upon a lump of sugar producing, almost instantaneously, all the curative effects of the five bulky doses of Dr. Affleck's emulsion.

From the dry state in which Mr. Bojer's supply of seeds must have reached this country, it may be difficult perhaps, if not impossible, to obtain from them a sufficiency of oil for experiment, and Dr. Affleck's emulsion may prove the most judicious form of exhibition. Although even should the effect disappoint expectation, we should not hastily condemn the remedy, or attribute to fanciful exaggeration the reports of experienced practitioners. Oleaginous seeds are subject to deterioration during a protracted voyage, and oil extracted from the recent seeds on the place of their production, sent home in well-closed bottles, would afford a much better criterion to judge from than any that could be obtained from them in this country.

It would be likewise important to determine by repeated experiments in what condition the seeds should be to yield oil in the greatest abundance, and possessing the greatest amount of activity.

A beginning, however, thanks to Mr. Bojers, has been made, although under an erroneous impression; and we can only hope that the subject will not be lost sight of again till a satisfactory solution shall have been obtained upon unquestionable grounds.

SULPHATE OF SODA CONTAINED IN QUASSIA WOOD.

BY MR. GEORGE WHIPPLE.

In making some "extract of quassia" some difficulty was experienced similar to that which sometimes occurs in operating on colocynth or hops,

especially old hops, and the result was the separation of a crop of crystals of sulphate of soda.

From the experiments of Pfaff (*Syst. Mat. Med.*, ii., 21) and others, the following appear to be the principal constituents of quassia:—Volatile oil, a minute trace; a bitter principle (quassite); gummy extractive; pectin; woody fibre; and various salts, such as oxalate, tartrate, and sulphate of lime; chlorides of calcium and sodium; an ammoniacal salt; and nitrate of potash.

Planche (*Journ. de Pharm.*, xxiii., 542) states that an efflorescence of nitrate of potash is frequently observed on quassia wood.

Now, this expression of Planche's must, I think, refer not the anhydrous salt, nitrate of potash, but to the very efflorescent salt, sulphate of soda, a sample of which is placed on the table in the state in which I obtained it from the extract of quassia.

I may further observe that Vauquelin considered the bitter principle of the colocynth and of the root of the bryony to be similar in properties to that of quassia; and Dr. Thomson found that when alcohol is digested for some months upon wheat flour, and then distilled, it leaves a yellowish-brown substance behind it, which, as far as he examined it, was found to possess the bitter principle of quassia.

CONVERSAZIONE.

On Wednesday, the 17th of May, a Conversazione was held at the house of the Society, and was very numerously attended by the friends and supporters of the institution, including a large number of medical and other scientific men, and Members from the country who had come to town to attend the Anniversary Meeting. The museum and other rooms containing the extensive collection of Materia Medica and of Chemical preparations, belonging to the Society, were thrown open at the usual hour. These alone would have afforded abundance of objects to excite the interest of a pharmaceutical company, presenting as they do so many rare and valuable specimens collected from every quarter of the globe, including at the present time the whole of the valuable collection of the late Dr. Pereira. Many of these specimens, for the display of which there is not sufficient room in the museum, were exhibited on this occasion, as also were a series of specimens of cinchona barks just presented to the Society by Mr. J. E. Howard, a description of which is given at page 671.

Among the objects exhibited the Council were indebted to

Mr. Howard Hopley, of Titchbourne Street, for a specimen of *Paullinia*, or *Guarana*, a powder prepared from the seeds of *Paullinia sorbilis*, a native of South America. This substance has attracted a good deal of attention among the medical profession at Paris, where it is prescribed as a tonic and astringent in cases of nervous headache. It is said to yield a crystalline substance resembling, if not identical with, caffeine. Also a specimen of "Egyptian Haschisch," in the form of an unctuous extract. This is one of the narcotic preparations obtained from the *Cannabis Indica*, and used among oriental nations for producing some of the effects of opium.

To Mr. Huskisson, for a series of crystallizations illustrating the manufacture of Rochelle salt. The series comprised the different varieties of tartar from which the salt is made, and the Rochelle salt, first in its impure state as obtained from crude tartar, and then in the different stages of purification as effected by re-crystallization.

To Mr. Collins, of Oxford Court, for some very beautiful specimens of hydrate of potassa and soda.

To Mr. C. Greville Williams, for some newly discovered volatile oily bases from shale naphtha, with their platinum salts.

To Mr. Griffin, for some new forms of Chemical apparatus, and a portable camera.

To Messrs. Knight and Sons, Mr. Mayall, Mr. Hanneman, and Messrs. Smith and Beck, for specimens of photography and stereoscopes.

To Mr. Varley, for microscopic objects.

To Mr. T. R. Nash, of 1, Leigh Street, Burton Crescent, for *a self-cleansing domestic filter*. This filter, which occupies very little space, is represented by the following engravings :—

Fig 1.—Is a Filter as fixed horizontally to an ordinary supply pipe.

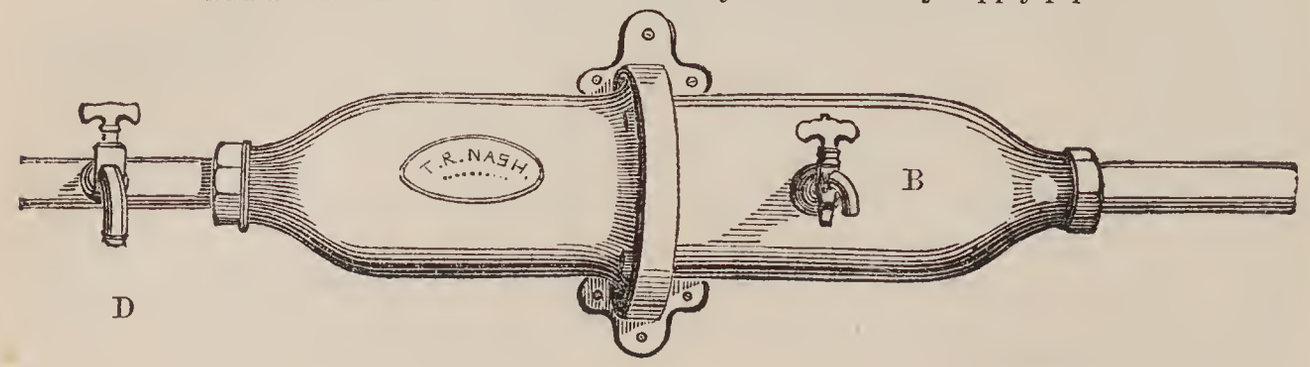
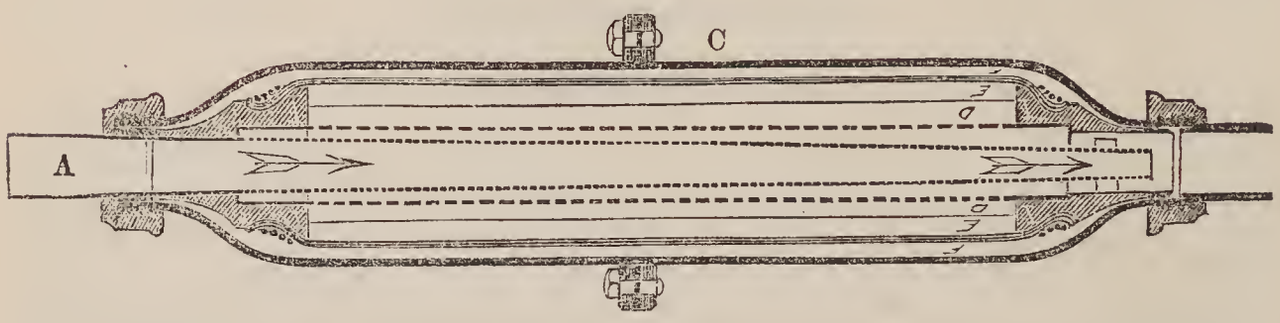
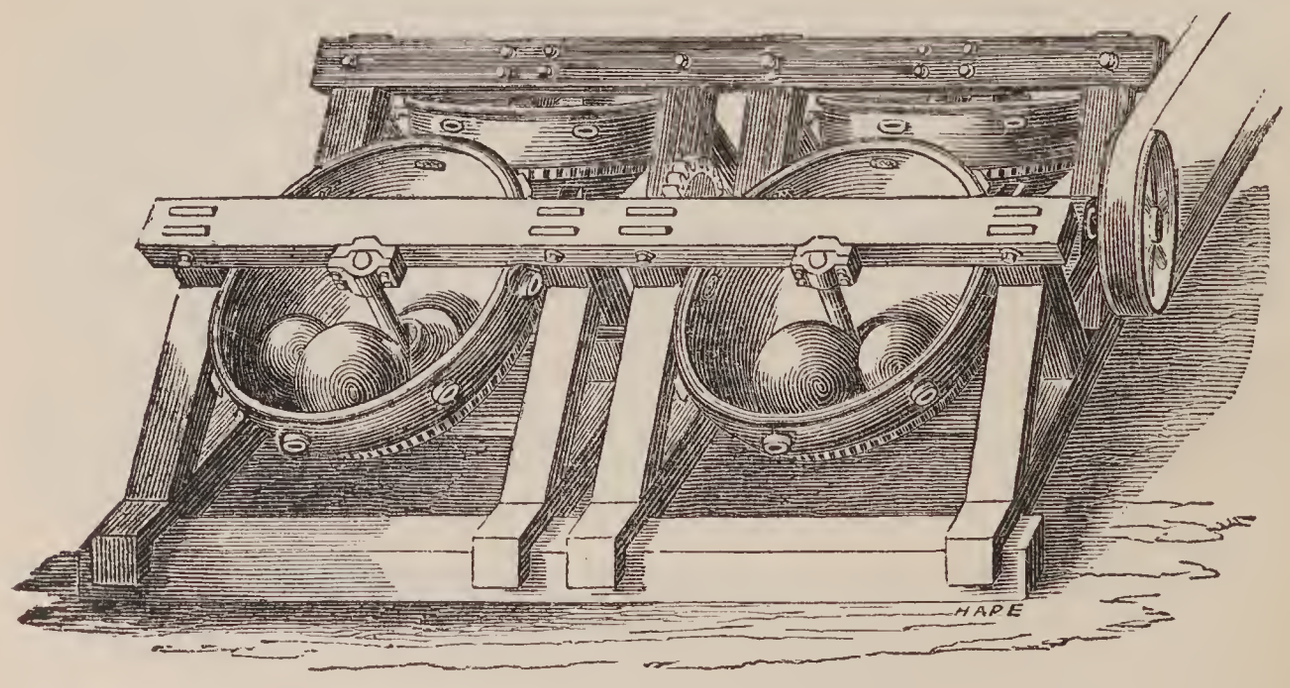


Fig. 2.—Is a section of the above.

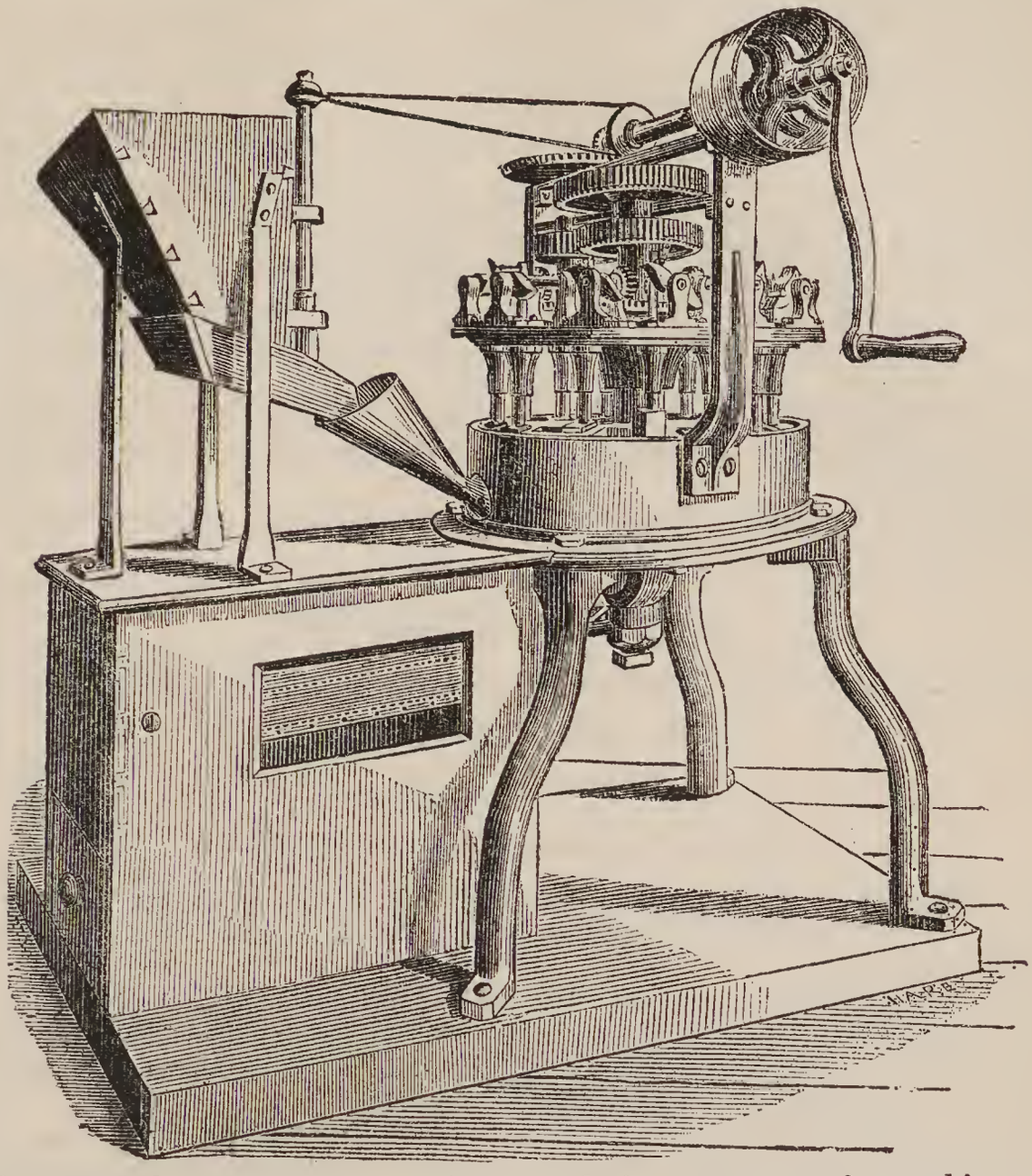


The water from the common-house cistern or other supply enters the filter at A, following the direction of the arrows in fig. 2, and percolates through the tubes and the filtering and purifying mediums contained in the filter-case C. The filtering mediums consist, for ordinary purposes, of fine flannel, animal charcoal, and calico. The filtered water is drawn at the tap B, while for common household purposes the tap D is used, and the water running freely through the pipe when this tap is opened, serves to cleanse the filter.

To Messrs. Nourse and Co., for a model of Berdan's "Gold Machine," of which the following is an engraving :—



Also, a stamping apparatus for powdering sugar, gum, resins, and other substances liable to clog, represented by the following engraving.



There was also exhibited a working model of an apparatus for crushing quartz or powdering other substances, by a combination of grinding and stamping processes, effected by the rolling and falling of heavy metallic balls. When the apparatus was put into motion, these balls moved in a circular direction, passing from one hollow surface to another, over intervening elevated ridges, and presenting somewhat of the character of a steeple-chase. The inventor and proprietor of the apparatus promised to send us a description and drawing of it, but these had not arrived in time for our publication.

To Messrs. Hopkins and Williams, for fine specimens of gallic acid, hyposulphite of soda, and red and yellow prussiate of potash.

To Mr. J. B. Hockin for a specimen of collodion contained in a sealed glass tube. This method of packing is suggested by Mr. Hockin as generally applicable for conveying volatile liquids to hot climates, glass stoppered bottles being found inefficient for this purpose, considerable loss often occurring from evaporation. Also some specimens of photography.

To Mr. George Whipple, for two samples of oil of pimento obtained at different stages of the distillation.

To Mr. Keating, for a specimen of *leefat* or *leef*, the fibrous part of a palm, used by the orientals in their baths. Also specimens of the telegraph cables about to be laid across the Mediterranean.

To Mr. Tennant, for some fine specimens of minerals.

To Mr. Sam. Highley, for a collection of models of crystals, in iron, illustrating Rose's system of crystallography.

To Mr. Edwards, of Liverpool, for some very beautiful photographic representations of the moon, taken at the Liverpool observatory by himself and Mr. Heartnap, and mounted for the stereoscope.

To Messrs. Powell and Sons, and Mr. Phillips, for specimens of ornamental glass.

To Messrs. Veizin and Hunot, for a newly invented apparatus called the Puro-gene, for the manufacture of aërated waters.

To Mr. Wm. Squire, for a series of portraits of eminent foreign Chemists.

To Mr. Appold, for models of his centrifugal pump, and of a labour machine, as used at prisons, &c. Also Wheatstone's apparatus for illustrating the wave theory of light.

To Mr. Hodges, for a great variety of articles illustrating the application of vulcanized India-rubber as a means of accumulating power for raising weights, and for projectiles.

To Mr. G. B. Goodman, for his instantaneous letter and music-binder.

To Mr. Burrows, for his gas-burners.

THIRTEENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 18.

MR. HENRY DEANE, PRESIDENT, IN THE CHAIR.

The Chairman, before opening the Meeting, stated that no persons but Members being entitled to be present, if any strangers were there they were requested to withdraw.

Mr. Dickinson rose to order. He wished to draw the attention of the Members to the manner in which the Reports of the Meetings were drawn up.

The Chairman said it was out of order to raise such a question before the business of the meeting had commenced.

Mr. Waugh said they might take it for granted that no *gentleman*, not being a Member, if present, would presume to retain his seat after the intimation that strangers were not admissible.

The President then addressed the meeting as follows:—

An eventful year has passed since we last met to receive the Report of the Council and to elect officers for the ensuing year. It has been fraught with no ordinary trials and difficulties, the end of which is not yet clearly seen, although it is hoped the time is not far distant when we may truly say peace and goodwill reign universally among us. From the copious Report about to be presented to you, you will be able to form an opinion as to the present state of the Society in comparison with former years; and although some features of that Report may not be so favourable as we could desire, I trust that as a whole it will afford satisfaction. It will show that unity and concord are essential elements of success—that their absence is a serious evil; but at the same time I trust that the mischievous and factious opposition of an individual, or at most a very small minority, has not to any serious extent weakened the good feeling existing among the Members, or permanently impaired the usefulness and prosperity of the institution. Perceiving the marked distinction between these two conditions,—concord and discord,—allow me to entreat you, while expressing your opinions on this occasion, to express them with temper and moderation, listening patiently to the opinions of each other however adverse they may be. For you

may rest assured, unless all exert themselves for the honour and credit of the Society to promote and preserve inviolate the strongest feelings of peace, harmony, and goodwill, confusion and discord will soon take the lead, and we shall fall back into that condition of national contempt and obscurity from which, thanks to our unanimity, we have during the last twelve years been gradually emerging. Let us bear in mind that we are working more for the rising generation and for posterity than for ourselves; and in proportion to the high and honourable sentiments and conduct of the present Members, so will be the prosperity and development of our trade-profession in the hands of our sons, apprentices, and assistants in future years. The example of the original Members had a remarkably good effect upon their young men, many of whom are now energetic supporters and valuable members of this Society. The unfortunate condition into which we have been so recklessly plunged has also produced its effect. The depression that has operated on the minds of the Members has greatly repressed the spirit, the hope, and the confidence of our Associates, and the progress that was making among them has been retarded by such discouragement.

The art and science of Pharmacy and Chemistry are essentially those of peace—on the one hand ministering as they ought, and do, to the alleviation of some of the most distressing conditions of our nature, and on the other, appealing to our best feelings; for, although we do not visit the sick and afflicted in disease, of what avail would be the care the most skilful Physician could bestow, if unaided by remedies on which he could rely, the result of the thoughtful and peaceful labours of the conscientious Pharmaceutist or Chemist? These labours are assuredly the best conducted, and afford the greatest amount of satisfaction, when the mind is at peace with our neighbours, when strife and turmoil are banished for the exercise of the grateful reflection that if the sick are not cured by the remedies we dispense, the fault, if any, does not lie with us, and confidence in our integrity is not likely to be shaken. Far different are the results arising from a disturbed state of mind and a quarrelsome disposition. It ill becomes us, therefore, to be at war with each other; it is not the way to gain the confidence of the medical profession, of the public, and the legislature, and consequently cannot advance our interests in any way whatever. Neither will it insure our obtaining peaceful, intelligent, and upright men to guide the councils of the Society, for such men shrink in dismay from the contact of discord, and will not accept an office in which they would be likely to be pointed at with the finger of scorn, derision, or contempt. The time of such men is too valuable to be frittered away in bickerings, in vain and discordant attempts at working out legal technicalities and obscure points of law, which neither our interests nor the requirements of the public demand, and which do not in any way conduce to the general good. But you will have in the council-chamber men more remarkable for energy in dispute than for strength of judgment; men who will rather sacrifice their own time and the interests of the establishment than relinquish a crotchet that has once taken possession of their minds. Of such too many exist in every community, but prosperity does not mark their footsteps, for they sow to the wind and consequently reap the whirlwind. Which class of men is most likely to advance your interests it requires but little discernment to determine; both are within your reach, and I earnestly desire you may take the right, and that one heart and one mind may animate us to persevere in an honourable, upright, and independent course, which will preserve us from internal dissension, and so strengthen our foundation that the fiercest attacks of our worst enemies will not move us.

The SECRETARY then read the

REPORT OF THE COUNCIL.

FINANCIAL REPORT.—RECEIPTS AND EXPENDITURE,

From January 1st to December 31st, 1853.

RECEIPTS

	£	s.	d.
Balance in Treasurer's Hands	35	7	3
Life Members' Fees	36	15	0
Benevolent Fund:			
Subscriptions 59 5 6			
Interest 121 13 5			
	180	18	11
Government Securities, Interest ...	181	5	8
414 Town Members' Subscriptions	653	12	6
2041 Country Members	2143	1	0
Entrance Fees	1915	4	0
469 Associates	246	4	6
Examination Fines	143	17	0
438 Apprentices	229	19	0
Registration Fees	54	7	0
Fees, Pharmaceutical Chemists	131	5	0
" Assistants	36	15	0
" Apprentices	56	14	0
Arrears of Subscriptions	132	5	6
Lecture Fees	7	7	0
	£6184	18	4

EXPENDITURE.

	£	s.	d.
Life Members' Fund Investment ...	84	0	0
Benevolent Fund:			
Investment 278 4 7			
Gratuities 45 0 0			
	323	4	7
General Fund Investment	2040	0	0
Sundries	2	13	0
Tin Cases for Certificates	51	9	8
Repayments	11	12	9
House Expenses and Painting	239	16	9
Rent, Rates, and Taxes	337	11	9
Furniture	10	13	3
Postage	106	9	11
Stationery	27	13	10
Advertisements	1	2	6
Printing	126	10	5
Certificates	95	0	0
Collector's Commission	50	6	9
Board of Examiners	67	4	0
Grant to Branch of Society in Scotland	87	6	10
Travelling Expenses, Country Members of Council	97	14	10
Salaries	468	15	0
Wages	124	9	0
Journals	722	16	3
Delivery of Journals	68	17	0
Library	41	6	8
Lectures	416	7	6
Apparatus	6	6	0
Laboratory Repairs	20	0	0
Balance in Treasurer's hands	555	10	1
	£6184	18	4

WE, the undersigned Auditors, have examined the Accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that, as shown by the books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1853:

	£	s.	d.
On Account of the General Fund.....$3\frac{1}{4}$ per Cents. Reduced	6036	7	1
Benevolent Fund ...3 per Cent. Consols...	4391	6	2
Life Members' Fund 3 per Cent. Consols...	810	8	10
And at the same date there was due to the Benevolent Fund...	0	10	0
And to the Life Members' Fund	36	15	0

EDWARD CONSTANCE,
ALFRED ALLCHIN,
THOMAS BURDEN,
JAMES LODGE MOORE,
} *Auditors.*

February 8th, 1854.

The Annual Reports of the Council, have, during the past twelve years, furnished the Members with a brief record of the progress of the Society, and the result of the united efforts of the Pharmaceutists of this country to protect their mutual interests, and raise their professional status. The progress thus detailed has been gradual, and attended with occasional delays and disappointments caused by opposition from without, which was ultimately overcome by perseverance and union within the Society. These exertions having resulted in the passing of an Act confirming the Charter of Incorporation, and investing the Society with additional powers and authority, the Council had reason to

anticipate not only a considerable accession of strength by the enrolment of new Members, but increased activity and prosperity in the several departments of the Society. The numerous applications for admission to the privileges of Membership, the long list of candidates for examination, and the crowded state of the School of Pharmacy, justified these anticipations, which the Council believe would have been fully realized if the Society had been preserved from the misfortune of internal dissension and litigation, which has given a temporary check to its progress and prosperity.

The disturbance of the harmony which had previously prevailed is much to be regretted, occurring as it did at a time when the united energy of the Members and the deliberate judgment of the Council were required for carrying out the objects of the Pharmacy Act, and securing to the Society the full benefit which that measure was intended to effect. The existence of a dispute on a legal technicality at such a crisis could not fail to distract the attention of the Council, to discourage the Members, to damp the ardour of the students, and to damage the Society in the estimation of the medical profession and the public. That such has been the result to some extent, will be seen on reference to the several sections of this Report.

THE LEGAL PROCEEDINGS AGAINST THE PHARMACEUTICAL SOCIETY.

It will be in the recollection of the Members, that shortly after the passing of the Pharmacy Act the Council convened a Special General Meeting (which was held on the 4th of August, 1852) to discuss the provisions of the Pharmacy Act, and to consider the steps which it might be expedient to take in reference to it. At this meeting it was unanimously resolved, "That in order to bring the Pharmacy Act into more extensive and immediate operation, it is desirable that the Pharmaceutical Society should include among its Members all duly qualified Dispensing Chemists throughout the United Kingdom." "That this meeting recommends the Council to adopt a liberal construction of the terms of the Act in regard to the admission of Chemists in business, on their own account, before the passing of the Act."

Several local meetings were held, at which similar resolutions were unanimously passed.

Sanctioned by this strong expression of opinion on the part of the general body of Members, and fully concurring in such opinion, the Council proceeded, under legal advice, to frame bye-laws in accordance with the principles laid down. These bye-laws were unanimously confirmed and approved by a Special General Meeting of the Members and by the Secretary of State as the Act directs. An entire code of bye-laws embodying the above was subsequently passed by the Council, confirmed and approved by a Special General Meeting with only three or four dissentients, and also by the Secretary of State, with a proviso which, as the Council are advised, does not invalidate the confirmation.

The Council admitted into the Society a large number of Members under one of the bye-laws so made and confirmed. At the time of the last Anniversary no question had arisen as to the validity of that bye-law, or the legality of the intended elections which took place shortly afterwards, the entire proceeding having been sanctioned by the unanimous approval of the Members at large, and also by the legal advisers of the Society.

It is scarcely necessary in this Report to advert to the circumstances under which the hostilities against the Society were commenced, or the spirit with which they have been carried on. The Members are sufficiently acquainted with the facts of the case to be enabled to judge for themselves whether the proceedings are instituted with a worthy object and calculated to lead to any practically beneficial result, or whether the attack should be regarded as an act of determined and reckless hostility to the Society and injustice to the Members elected under the new bye-laws. The Members will also form their own opinion as to the propriety of the course the Council have adopted in defence of

the Society against this attack, which, if successful, would deprive it of nearly a third of its Members, besides causing other difficulties, the extent of which it is impossible to foresee.

REPORT OF THE BOARD OF EXAMINERS.

The Board of Examiners report that the number of candidates examined during the past year exceeds that during any previous year, as will be seen by the annexed table, showing the number who have passed the several Examinations for the last seven years :—

	1847	1848	1849	1850	1851	1852	1853
Classical	82	79	80	73	174	199	217
Minor	11	24	23	22	30	94	89
Major	12	21	21	19	24	68	188

Total from the commencement.....Classical 1136—Minor 359—Major 382.

This influx of candidates during the years 1852 and 1853 resulted in part from the stimulus occasioned by the passing of the Pharmacy Act, which gave rise to an increased desire to join the Society, and in part from the announcement which was made by the Council about that time to the effect that the examinations would be more stringent after a certain date. It being impossible to examine all the applicants within the period specified, it was decided that the new regulations should not be enforced in the cases of Candidates applying before the 1st of May, 1853. The number on the list at one time amounted to upwards of 200; but the business of the Society having been suspended for several weeks during the time of the greatest pressure, and other sources of discouragement having occurred, eighty of those who had given their names did not present themselves for examination.

The Board of Examiners have observed with satisfaction the beneficial influence of the examinations in promoting industry and studious habits. Those Members of the Board who have been in office from the commencement have noticed a considerable improvement in the proficiency of the candidates. This, however, has not been uniform, nor has it been without occasional exceptions. In some instances these exceptions have arisen from an entire misconception as to the nature of the qualifications required, and a want of proper facilities for study during the period of apprenticeship. It has not unfrequently been stated by young men who have been found deficient in knowledge that they had no supply of chemical or other scientific books; in some cases, the only Pharmacopœia in the establishment was an old edition of Thomson's *Dispensatory*. Under these circumstances candidates have been advised to withdraw, and enter upon a course of study for six or twelve months, after which they have again presented themselves and afforded satisfactory evidence of diligent attention to the advice received.

As a general rule, the Board have observed the greatest proficiency in the Students who have attended the Laboratory and Lectures of the Society. This rule is not without exceptions, as young men from the country, who have had no instruction, and have qualified themselves by their own unassisted exertions, have in some instances exhibited an amount of practical and scientific knowledge highly creditable to themselves and satisfactory to the examiners. It must also be remarked, that the education afforded by the Laboratory and Lectures of the Society is not all that is required by the Pharmaceutical Student. Candidates whose attainments in the higher branches of chemical science are much above the average, are sometimes found deficient in reading prescriptions, and unacquainted with some of the practical details of the business. Yet experience has shown, that the education thus acquired has afforded a safer

foundation whereon to raise a sound practical acquaintance with every department of the trade, than the cursory knowledge obtained by young men who are left to rely solely on the too frequently scanty attainments of an apprenticeship. This systematic instruction has prevented many young men from falling into gross errors, both in the dispensing of prescriptions, and in the preparation of various compounds required for that purpose. Students would derive much more benefit from this course of study if those who have the care of their early training would consider it to be their duty to take care that they are supplied with the needful books and such other facilities as may be accessible in their localities.

From the above observations the Board of Examiners have arrived at the opinion,

1st. That although in a few exceptional cases a satisfactory qualification may be attained by private study, unassisted by the appliances of a scientific laboratory or lecture-room, the number of young men possessing the tact and natural aptitude for self-instruction is very limited, and that without the advantages of a regular system of education, the cases of proficiency would be rare exceptions to a general mediocrity; 2ndly. That a system of scientific education is not alone sufficient to ensure the proper qualification of the Pharmaceutical Chemist without a certain amount of practical experience in a Dispensing establishment.

THE SCHOOL OF PHARMACY.

The Council are of opinion that the School of Pharmacy continues to be productive of great practical benefit both to the Society and the public, as it affords a kind of instruction not to be met with elsewhere, and adapted especially to the rising generation of Pharmaceutical Chemists. Although these advantages are not yet so fully and generally appreciated by the young men as they ought to be, the Council trust the time will arrive when the demand for systematic pharmaceutical education will be sufficient to maintain an independent school or schools. That this is not yet the case is shown by the financial statement of receipts and expenses of the School of Pharmacy, and by the failure of other establishments of a similar nature.

The Professor has furnished the following statement of the

RECEIPTS AND EXPENDITURE IN THE LABORATORY,

From the 1*st of October*, 1852, *to the* 31*st of July*, 1853.

RECEIPTS.	£	*s.*	*d.*
Fees from Fifty-one Pupils	838	4	0
	£838	4	0

EXPENDITURE.	£	*s.*	*d.*
Drugs, chemicals, apparatus, fittings, and repairs	351	2	6
Gas, coal, and coke	59	18	1
Salaries to Assistants, &c.	237	1	0
	648	1	7
Balance to Professor	190	2	5
	£838	4	0

The above account does not include any charge for rent, rates, and taxes, or the expenses of the lectures, which are contained in the general financial statement.

It will be seen that the number of Students in the laboratory during the last session was unusually large, a circumstance which is, no doubt, mainly attributable to the passing of the Pharmacy Act, by which many candidates, who would not otherwise have done so at so early a period, were induced to prepare and present themselves for examination prior to the introduction of the more stringent regulations subsequently adopted. The expenditure for the period referred to bears an undue relation to the receipts in consequence of the necessity there was for providing accommodation for the increased number of Students. This greatly increased demand for education has been succeeded by an equally great falling off, so that the present session is one of unusual

depression. Such a result would in some degree follow from the forced activity of the previous session, but there is reason to believe that the general depression caused by the legal proceedings now pending has extended its influence to the school as well as to other departments of the Society. The Council hope and believe, that this depression is only temporary, and that when the questions which have involved the Society in difficulty have been settled, the regular business will proceed with renewed activity. Although the School of Pharmacy entails some expense on the Society, and is not likely at any future time to become a source of revenue, the Council consider it a very important branch of the establishment. The Royal College of Chemistry, notwithstanding the distinguished patronage under which it was carried on, and the liberal contributions to its funds, has been discontinued as a separate establishment, and the Laboratory is now kept up at the expense of the Government, in connexion with the Museum of Economic Geology. This additional evidence of the inadequacy of the returns of a Chemical School to defray its current expenses, confirms the Council in the opinion, that the time has not arrived at which the maintenance of Schools of Pharmacy can with propriety be left to private enterprise. The School of the Society has been resorted to by the sons of Members in the country, and by assistants and apprentices, who have come to London for the express purpose of enjoying its advantages. It has afforded education to many Students who had no other available means of attaining the same amount and description of qualification, and has answered the purpose for which it was founded, although to a more limited extent than its original promoters anticipated. The Council trust that the Members will be convinced of the propriety and policy of continuing this School, and encouraging their assistants and apprentices to avail themselves of its advantages.

THE EVENING MEETINGS.

Some improvement has been observable in the attendance at these meetings during the past session, and the supply of papers and subjects for discussion has of late been abundant. An extra meeting was held on the 3rd May, for the purpose of discussing several subjects which were adjourned from the meeting in April.

The Council consider the continuance of these meetings a favourable indication, at the same time it is to be regretted that many Members of the Society whose experience would contribute greatly to the interest and practical utility of the discussions, are not among the regular attendants. It may be well to remark in this place that each member has the privilege of introducing a friend, and that additional cards may be obtained on each occasion by application to the Secretary. The advantage of inviting medical men to these meetings is obvious, as an opportunity is thus afforded for discussing together the preparations of the Pharmacopœia and other subjects mutually interesting to the medical profession and pharmaceutists, besides making more generally known the objects and beneficial tendency of the Pharmaceutical Society.

THE LIBRARY AND MUSEUM.

107 volumes have been added to the Library during the past year.

The regulations for the circulation of books have not been very extensively taken advantage of by the Members. During twelve months the number of volumes taken out of the Library under these regulations has averaged rather less than three per diem. The Museum has received some important additions, among which may be mentioned three cabinets containing interesting specimens collected by the late Dr. Pereira.

PRIZE MEDALS.

The medal, which has been for some years in contemplation, has been established during the past year. It is termed the Council Medal, and is recommended as a substitute for books at the annual distribution of prizes.

A medal in memory of the late Dr. Pereira is also in progress of execution by Mr. Wyon, and will shortly be completed. Voluntary subscriptions, more than sufficient to defray the cost of the die, have already been received; and it is also proposed to raise a fund to endow the medal.

THE BYE-LAWS.

The Council have reconsidered the bye-laws of the Society with a view of making such alterations as might be deemed expedient. Some suggestions which were offered by Members at the last Anniversary were duly considered; of these the most important, relating to the transmission of the financial statement, has already been acted upon, the balance-sheet having been forwarded to the Members in the Transactions for March. Under legal advice, the Council have decided not to make any alterations in the bye-laws, under existing circumstances, with the exception of the substitution of December for July in the 7th clause, section 1. This alteration is necessary, as many of the Members to whom that bye-law is intended to apply, were not elected until after the first of July, on account of the delay in the confirmation of the bye-laws by Lord Palmerston, which caused a temporary suspension of the business of the Society.

THE BENEVOLENT FUND.

Several applications have been made since the commencement of 1853 for relief from the Benevolent Fund. Of these only four were such as the Council could comply with, the other applicants having discontinued their connexion with the Society, and thereby forfeited their claim on the Fund. According to the terms of the Charter the Fund is to be appropriated to the relief of distressed "MEMBERS AND ASSOCIATES, THEIR WIDOWS AND ORPHANS;" and the Council have no power to grant relief to any other persons, although they may at some former period have been connected with the Society. On a recent occasion the Council had to regret their inability to entertain an appeal on the part of one of its early supporters, who had been for several years a Member of the Council, but had retired from the Society about four years prior to the date of the application. Similar cases have previously occurred. The Council consider the Benevolent Fund an important object of the Society, not only on account of the valuable assistance which it occasionally affords in time of need, but also as a means of promoting union and good fellowship among the Members. They suggest that a public dinner on behalf of this Fund might be attended with a favourable result at the present time.

THE NORTH BRITISH BRANCH OF THE PHARMACEUTICAL SOCIETY.

The Annual Report of this Branch of the Society was published in the Transactions of last month. The local affairs are under the management of a Committee or Council, with other officers appointed annually at a meeting held in Edinburgh. The examiners are, as the Act directs, appointed by the Council in London, to whom the names of the parties recommended by the North British Branch are transmitted for approval. The proceedings of the Board and other local proceedings are reported from time to time to the Council with an account of the expenditure which is included in the Report and Financial Statement. These arrangements have been found practically beneficial and conducive to the harmony of the Society, by affording the advantages of local self-government, subject to the general control of the Council. The North British Branch of the Society is especially interested in the question now pending in the Court of Queen's Bench, as a large majority of the Members in Scotland were elected under the bye-laws after the passing of the Act.

PROVINCIAL TRANSACTIONS.

Reports of the proceedings of the local associations have been published at intervals during the past year, as a supplement to the Transactions of the

Society. The Council are glad to observe a continuance of these endeavours to promote education and the advancement of scientific knowledge, but the perplexity in which the Society has been involved by the existing dissension has tended to check the progress of all proceedings connected with its objects.

THE ORGANISATION OF THE SOCIETY.

The last Annual Report contained a suggestion respecting the periodical appointment of local secretaries by the Members in the several provincial towns throughout the kingdom. The Council think it right again to advert to the subject, and recommend the Members in their respective localities to meet as early as may be convenient after the Anniversary, for the purpose of appointing officers for the ensuing year. Reports of proceedings in some of the most important provincial towns have from time to time been published in the Transactions, showing the advantage of local organisation in promoting unity among the Members, the advancement of education, and the other objects for which the Society was founded.

THE MEDICAL BILL.

Some provisions of the Medical Registration Bill introduced into the House of Commons by Mr. Brady having been calculated to interfere with the interests of Pharmaceutical Chemists, a Committee was appointed by the Council to watch the progress of the Bill, and communicate with its promoters, who consented to make such amendments as would remove the above source of complaint. The Bill has subsequently been thrown out.

CONCLUDING REMARKS.

The influence of dissension and litigation has retarded the general progress of the Society by giving rise to doubts and distrust in the minds of many whose cordial support the Council had reason to anticipate.

Of the 728 Members elected under the bye-law of Nov. 1852, and the 313 elected under the old bye-laws since the passing of the Act, 70 have not taken up their membership. Of the new Members who availed themselves of their election 192 have not renewed their subscriptions, but wait the result of the legal proceedings. Of the other Members a considerable number were defaulters on the 1st of May. It is possible that some may have been influenced by certain representations which have been in circulation to the effect that it is not necessary to continue the subscription, and that the bye-law requiring Members to comply with the terms of the Charter cannot be enforced; but the Council do not anticipate that any permanent injury will result from these endeavours to deprive the Society of the resources necessary for its support. The Members who applied to the legislature for the powers with which they were entrusted under the Pharmacy Act, must be aware that these powers are attended with corresponding responsibility; and their application having been complied with, they cannot now shrink from the duty imposed upon them at their own desire without forfeiting the privileges granted conditionally upon the performance of that duty. The Council are fully sensible of the difficulty which often arises in the construction of new Acts of Parliament, which, however carefully they may be drawn, furnish to persons prone to litigation the opportunity of indulging in that propensity. But the Pharmacy Act having been passed for the improvement of the general body of Pharmaceutical Chemists, and the bye-laws having been framed with a view of carrying out the spirit and intention of the Charter and the Act, the existence of a dispute among the parties having a common interest in promoting these objects is an indication of a disposition which, if persisted in, is calculated seriously to injure the Society without leading to any practically useful result. If every difference of opinion among the Members were to be made the subject of an appeal to a court of law, the Society could not long exist; and as the legal right of individuals to embark in litigation

cannot be disputed, the Council appeal to the Members at large, whose united influence may have the effect of discountenancing, and thus preventing, a continuance or repetition of such proceedings.

It is an undoubted fact that no Society can prosper and enjoy the confidence and respect of the public so long as it is divided against itself, and unable to settle differences of opinion among its Members without the intervention of a Court of Law.

Mr. William Ashton moved "That the Report now read be received and adopted, and published in the Transactions of the Society."

Mr. Peacock seconded the resolution.

Mr. Fell quite concurred with the concluding remarks in the Report, but he thought the case unfortunate. The Council were in a state of embarrassment which might last for years. A middle course might have been adopted, as he had proposed last year, a Committee might have been appointed of twenty-four Members, twelve of whom should be chosen by the Council, and twelve by Mr. Dickinson, calmly and dispassionately to consider the subject. It could do no harm. Had the Council any resolution to propose? (The Chairman said they had none, but left that to the Members.) Then he would move an amendment:

"That it being the opinion of this meeting that a Committee formed of twenty-four non-official Members of the Society—twelve to be chosen by the Council, and twelve by Mr. Dickinson—would be able to adjust the unpleasant differences at present existing in the Society, and terminate a dispute both tedious and expensive, it be now resolved that such Committee shall be forthwith appointed, with a view of staying further proceedings, which may ultimately prove detrimental to the Society and prejudicial to the general interests of its Members."

On the amendment being read, it was suggested that it ought to be moved as a separate resolution, after the other had been disposed of.

Mr. Bottle said he represented the Chemists at Dover. In quarrels there were generally faults on both sides—an impartial Committee might adjust the differences—as between the Russians and the Turks. On looking at the Report, he observed that the house expenses, usually about £50, were this time £239. (The Secretary said £170 of the amount was for painting the house throughout, as required by the lease.) He objected to the charge for collector's expenses. The salaries were reduced, but the item of wages had risen amazingly. He observed no law charges mentioned. (The Chairman said the solicitor's account had not been sent in at the time the balance-sheet was prepared.) Then the Council ought to have sent for it. Law charges should be paid every year. The purchase of 2000 Consols for £2040 was a very injudicious investment, as funds had fallen more than 10 per cent. since that time. Private persons took more care of their money—but the Council had a strange method of conducting business. They had resolved to displace Mr. Bastick from the Board of Examiners—then they found it to be illegal. They should have ascertained that first. They next moved the expulsion of Mr. Dickinson, and told him he was expelled, when a new light broke in upon them, and they wrote to him to reverse the sentence. Did they profit by these lapses of power? He and the other Members at Dover did not think the Council had exercised sufficient tact and judgment. The Charter gave them power, without bye-laws, to examine candidates and elect Members. They might have proceeded without waiting for the confirmation of the bye-laws. He should not move an amendment, nor enter into any disputes, but merely wished to make a few business-like remarks.

Mr. Fell had paid his subscription to the collector, who gave him a receipt. He, nearly a month afterwards, received a circular, asking for his subscription, and after that the Secretary sent him a second receipt. He now had two receipts for the same subscription. [The Secretary explained that the circular was issued before the collector had rendered his account. He (the Secretary) sent an official receipt to each Member, as evidence of his registration. The collectors in localities where they were employed gave receipts on their own account, but the counterfoil of the official receipts formed one of the registers of the Society.]

The Secretary commenced reading the items of house expenses, but the meeting considered it unnecessary.

Mr. Jacob Bell said a few words in explanation of some of the matters to which Mr. Bottle had referred.

Mr. DICKINSON said the Members might probably expect him to have something to say, and would go away disappointed if he did not speak. (A Member—Cut it short.) He would attend to the suggestion, and cut it as short as he could. He had stated that the reports of meetings had always been garbled in the Pharmaceutical Journal. It was not he alone that complained—he could bring forward hundreds who agreed with him on the subject. He alluded to past reports—they might be better in future. On that morning a reporter with whom he was acquainted had applied to the Council for permission to attend, and had been refused. (Mr. HERRING—There was no official application.) The reporter had sent a message to the President, and it was discussed in the Council. The Council had admitted the advantage of employing a reporter, yet no arrangements had been made, and it was to be done in the old way. Mr. Bell and his friend, who were taking notes, could not report the meeting correctly. It could only be done by a short-hand writer. He objected to the way in which the Annual Report was got up. At the meeting of Council on the 3rd of May, they were told that it was not ready, and he had never seen it until that morning, when it was read in Council from the chair, no other copies being struck off for the Members of Council. He could not take in all the details at the moment. The Secretary admitted that he had a proof. (SECRETARY—Not a complete one.) Well, it might have been a garbled one. Much stress was laid on the difficulties the Council were in, and which were attributed to him. They were difficulties of their own creation. They had brought them on themselves by not doing what was right. He had been accused of intemperate language, but he had been as harshly dealt with himself, and branded with not acting like a gentleman. He did not care about it, but was rather proud of his position, and boasted of it. With regard to the new Members, a point occurred to him, that prior to the date of the Charter Members were admitted on certificate; afterwards, a school was established, young men studied, and duly passed the examination. But on the passing of the Act the Council placed others on the same footing without being examined, which was a gross injustice to the young men who had passed. In August a meeting was held, as stated in the Report, and a resolution was passed in favour of a liberal construction of the Act. He was absent from that meeting, and rose from a sick bed to attend the next meeting of the Council to caution them against the admission of Members as proposed. The bye-laws were passed in consequence. But before this, meetings had been held in the country to induce persons not Pharmaceutical Chemists to come in. He had founded his objections on high authority, but was glad to hear that the Council had obtained legal opinions in favour of the bye-laws, and seconded their adoption, being desirous of putting a liberal construction on the Act. Before many weeks he found he had been wrong, and then he felt it to be his duty to place the parties in their proper position. Through good report and evil report he had stuck to the opinions received from his legal advisers. He was in an invidious position, but felt no terror, and did not flinch. In the course of these unfortunate proceedings he had repeatedly offered to settle the dispute by a friendly arrangement with the Council. (The President and several Members of Council observed, that this was the first time they had heard of it.) He had stated that if the Council would submit a case, properly drawn, to a competent legal authority, and the opinion should show him to be wrong, he would abandon his proceedings. Bye-laws were a nullity if they contravened an Act of Parliament. It had been decided not to discuss the bye-laws at that meeting. He had never had an opportunity of fully discussing the bye-laws. They had been confirmed for a year, and he had contended that they were open for revision and required confirmation then, but this privilege was denied. He was prepared to go into a discussion on the bye-laws, and many other Members desired it, but the Council would not allow them an opportunity. He had been accused of circulating an opinion that Members need not continue their subscriptions. No man in his sane senses would give out that a member of a society need not subscribe to it, and he had never made such an assertion. What he said was, that no member need continue his subscription in order to remain on the register as a pharmaceutical chemist. He repudiated the report of the Council; it was not his report. The *Pharmaceutical Journal* was used improperly to bias the Members, but he was case-hardened. He owned himself guilty of using the public press to put forth statements, and asserted his right to criticise the Council. One man could do little against twenty, but he would not admit that the minority were obliged to bow to the majority; it was a proposal unheard of. His colleagues had allowed their usual mouthpiece to explain (Disapprobation.) He was not in a mood to

say anything offensive. Mr. Bottle had properly alluded to the impropriety of purchasing stock, which was objected to at the time by one Member of the Council, but the objection was overruled by another, who said that having money they ought to invest it. (Mr. WAUGH hoped that subject would not be further discussed. The Council had acted for the best, and could not be held responsible for the fluctuations in the price of the funds.) With regard to the attempt of the Council to remove him from the Society he was quite indifferent; he would rather like to be a martyr. If he had been expelled he should soon have come back. He should have appealed to the Court of Queen's Bench, and Lord Campbell would have sent him back. It had been said that the Society was in a dilemma from the delay in the confirmation of the bye-laws. There was no necessity for waiting until the bye-laws were confirmed ; it was only an excuse for the shortcomings of the Council, and to cast odium on him. With regard to the subscription, the collector had applied to him and he told him he would never pay any more money to the Society, but he afterwards paid in order to allow his name to stand for the Council. He did not approve of two receipts ; it was not necessary, and a needless expense of postage. Up to the last moment he had not intended to stand for the Council, but he was twitted with cowardice, therefore he wanted to show he was not afraid to meet them, although he knew perfectly well he should not be elected, for these 1200 new Members would naturally consider him their enemy, although he only wished to do his duty. It was only to increase expenses and give more annoyance that the Council persevered in the course they had taken in the defence. They might easily have put an end to the dispute, by allowing the case to go to trial instead of demanding a special jury, which threw it out of its regular order. Lord Campbell having allowed it to go to a special jury, had put off the trial until the end of June, in order that he might try the case himself. He hoped there were Members present who did not think him the blackguard he had been represented.

Mr. PEACOCK thought no evil had arisen from the election of the new Members under the disputed bye-laws, as they were all admitted on certificate of qualification, signed by at least two Members. The older Members were also elected in a similar manner, without which there would have been no Members to conduct the early examinations, and transact the other business. If some did not join the Society earlier, they no doubt had a reason. They might desire to be raised to a *status* above that of grocers and oilmen ; but without an Act of Parliament, they could see but little prospect of this result. He had watched the progress of the Society from the commencement, and thought it had done very little prior to the Act to raise the *status* of the trade, but the Act could not fail to produce this effect, and it was only fair to allow time for those to come in who felt so disposed, and produced satisfactory certificates. What good could arise from the opposition ? Would the Society or any one be benefited by turning out 750 or 1000 Members ? Up to the 1st of May, 1853, was the time to enter ; no person could now be admitted without examination. Why need the question be raised ? The dispute last year was about £ *s. d.* That might have been met by a conditional reduction of the subscription as soon as the Society could afford it, but at present the subscription must of course be kept up.

Mr. DAVENPORT said that Mr. Bell was not, as stated by Mr. Dickinson, the mouthpiece of the Council. All the Transactions were submitted to the Committee, and frequently amended and altered. Mr. Dickinson appeared to be proud of his position, but it was not an enviable one. Lord Campbell had not said that he wished to try the case himself, but said it was a very important and difficult one, and quite suitable for a special jury.* Mr. Dickinson had not commenced his proceedings to promote the welfare of the Society, but from personal malice. It was usually the case in disputes, that there were faults on both sides, but what were the two sides in this case ? Mr. Dickinson on one side ; who on the other ? The Society. He hoped the meeting would pass a strong resolution expressing their decided opinion. The bye-laws, although originally framed by the Council, had been adopted by the whole Society, and the Council were bound to carry them into effect. Mr. Dickinson was endeavouring to make the Act retrospective. It had been proposed to have a Benevolent Fund Dinner. He should be glad to propose a dinner for the purpose of expressing the gratitude of the Members to Mr. Bell for his exertions on behalf of the Society, and that a portrait of Mr. Bell should be placed on the walls.

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* A *verbatim* report of what occurred in the Court of Queen's Bench on the occasion referred to will be found in another part of this number.—ED.

Mr. Bell could not allow any discussion to take place on the subject mentioned at the conclusion of the remarks of Mr. Davenport. He fully appreciated the kind intention, but regretted that it had been mentioned, for nothing could be more detrimental to the interests of a Society than such a proposition, and he hoped the Members would dismiss it from their minds. It was most injurious to single out any individual, whatever he might have done, and to place him in a prominent position. In a neighbouring institution the portrait of one of its early supporters had been recently suspended in the Board room, and had occasioned much jealousy and dissatisfaction. The proceedings against the Pharmaceutical Society had originated entirely in jealousy. This jealousy had degenerated into hatred and malice, which had led by degrees to a determined hostility to the Society. Anything which would tend to increase the jealousy would be adding fuel to fire, and make the matter worse. They ought to forget individuals and keep their minds steadily fixed on the object which had originally brought them together at a time when they were despised and supposed to be incapable of uniting for any good purpose. They had during several years contended against much opposition from without, which had been surmounted, and there was nothing left but to take advantage of the victory. A more serious evil had now arisen, namely, dissension among themselves, for one enemy within the camp was more formidable than five hundred without. External opposition tended to bind them closer together, and stimulated them to energetic measures, but a black sheep in their own fold was a source of discord and discontent which could not fail to bring the Society into contempt, and was likely to discourage and estrange its most zealous supporters. In almost all the discussions of the Council, when one individual was absent, the decisions were either unanimous or nearly so—there was a general disposition to yield minor differences of opinion for the sake of harmony, and those who were in the minority bowed, as sensible men always did, to the opinions of the majority. But when that individual was present it was quite different. As soon as one difficulty was got over he would raise another, and his object appeared to be to oppose all his colleagues for the sake of opposition. Every endeavour had been used to conciliate him, but there was a limit beyond which conciliation was impossible. When it could be shown that the entire policy of a man was destructive and subversive of the objects and interests of an institution of which he pretended to be the advocate, it was obvious that his colleagues could not work harmoniously with him, and this could be demonstrated to be the case with Mr. Dickinson's policy. In the first place, the aim of his present proceedings was to expel about a third of the Members of the Society, not on account of any evil arising from their continuance as Members, or to support any public principle, but simply for the purpose of proving, if possible, by some intricate legal technicalities, that the Act of Parliament was defective, and not in accordance with the intentions of the Legislature. 2ndly. He attacked the School of Pharmacy, which had given a character and importance to the Society, before the Committee of the House of Commons, and had stamped it as an institution designed to carry out a great educational improvement. This he had used all his endeavours to injure and demolish. 3rdly. The Journal was an object of his implacable resentment. It was well known that from the commencement of the Society up to the present time many Members, especially those in the country, had considered the Journal the only advantage they derived from their subscriptions, and had continued their membership on this account. For this reason the Journal had been persevered in, and no other consideration would have induced him (Mr. Bell) to undergo the labour and responsibility of editing it. 4thly. Mr. Dickinson had endeavoured to persuade those who were Members at the date of the Act, that there was no necessity for them to continue their Membership, that they might enjoy the chief privilege—that of registration as Pharmaceutical Chemists, without further payment. If he should succeed in this policy, he would first deprive the Society of a third of its Members, and then remove the principal inducements to support it, the natural result of which would be, that most of the remaining Members would secede, and the Society would dwindle down until none were left but the few individuals, who without any tangible equivalent for their money, would be satisfied to bear the burthen of keeping up an establishment intended for the general benefit of the entire body. Having contrived these means of depriving the Society of the legs on which it stood, and cutting off its resources, he had come forward with a proposition to transfer £500 from the general account to the Benevolent Fund. It might be very proper with an

overflowing income and cheering prospects to appropriate a portion of the surplus to this benevolent object, but what could be thought of the policy of the man who, while he was striving in every way to cripple and undermine the Society, and subjecting it to the expense of vexatious and useless litigation, selected this opportunity for giving away £500 ? He threatened a suit in Chancery to throw the legal expenses on the Council. The Members would form their own opinion as to the justice of this proceeding. The Council were carrying out the laws adopted by the Members, and were acting under competent legal advice. Mr. Bramwell had strongly urged them not to fall into the trap which had been laid for them by agreeing to a special case, which would deprive them of the right of appeal in the event of any oversight in preparing the case, or any other accident. It must be borne in mind that the stake at issue was a most serious one, that it was impossible to foresee the extent of the perplexity and injury to the Society which might arise from a defeat, that no practical advantage of any kind or to any persons could result from the proceedings, which must be regarded as factious and vexatious. It was therefore the duty of the Council to offer the most determined opposition to this unworthy attempt to break up the Society, and they were bound to reserve the right of appeal to another court, or even to the House of Lords, in case it should be necessary. Mr. Dickinson had complained of the manner in which the Report of the Council had been got up, and that he had not seen it until that morning. It had nevertheless undergone careful and repeated revision by other Members of the Council, and was adopted unanimously, with the exception of Mr. Dickinson. He (Mr. Bell) appealed to the Members to consider the anomalous position of the Council, with an enemy at the Board finding fault with everything, and consistent only in his determined hostility and incivility to his colleagues. How would it be possible to settle any report or other proceeding with such a person, whose ruling principle was that he would have his own way, even if all the other Members were unanimous against him ? In the deliberations on the defence of the Society it was necessary to delegate much responsibility to the President and Vice-President, as such subjects could not with propriety be discussed in the presence of the prosecutor. The right of any individual to go to law could not be disputed. Any man might bring an action against another for an imaginary debt, and an Act of Parliament furnished numerous questions on which factious prosecutions might be founded. But the Council had a great responsibility upon them, and while they exerted themselves to carry out the views and support the decisions of the Members, they might fairly expect the unequivocal countenance and support of those who had appointed them to perform this arduous duty.

Mr. Humpage thought the Council ought to be quite satisfied with the proceedings at that meeting. He had watched their proceedings. It was true they were not omniscient—they could not foresee what would be the price of stocks at any future time. Neither were they omnipotent—they could not prevent the obstruction caused by Mr. Dickinson. Their only fault had been, that they had not viewed the case exactly as Mr. Dickinson had done! He arrogated to himself all that concentrated wisdom, foresight, and caution, which enabled him to know exactly what was right, and to decide as to the legal interpretation of the Act. To differ from him was an unpardonable transgression. In all committees the minority bowed to the majority. If one man found himself alone in a minority he might retire. If Mr. Dickinson had retired from conscientious motives he would have acted nobly and with independence—he would have been honoured and respected. But it had been truly said, that jealousy had been the instigation of the proceedings ; and what would not jealousy effect if it once gained possession of the human mind ? Jealousy occasioned the first murder—Cain killed his brother Abel because he was jealous of him. It was a dangerous and unworthy passion.

Mr. Cheetham (of Nottingham) attended as a country Member; he was authorised to state, that the Members in his locality unanimously approved of the proceedings of the Council, and considered the Society much indebted to them for their zealous exertions on its behalf.

Mr. Macfarlane was quite willing to allow Mr. Dickinson's statements to be taken for what they were worth. Everything of any importance had been already so fully and completely replied to as to render any further observations unnecessary. One thing he would remark, that if any Member had entertained doubts regarding the propriety of refusing Mr. Dickinson's request to be allowed to introduce a reporter,

these doubts must have been effectually removed by his speech. He seemed to regard everything as garbled which was not given at full length, and assuredly no paper which had the least regard for its circulation would ever think of giving such an effusion at length ; or if it did, the effect would be to hold up the speaker to universal ridicule and laughter. This occurred on one occasion in Edinburgh—a gentleman who was constantly complaining of his speeches being garbled, wrote out one which he specially desired to preserve, and handed it to the reporter, who was kind enough to give it *literatim et verbatim* as he received it, and thus made him the laughing-stock of the town. Mr. Dickinson affirmed that he had been willing to refer the case to the decision of one independent lawyer ; but had he been sincere in this, he had in Mr. Tidd Pratt everything he could desire. But that gentleman's opinion being against him, he was not satisfied until he had obtained another and an opposite one. Now an opinion depends entirely on the case submitted, so much so that not the slightest weight is due to any opinion without an inspection of the case along with it. One of the most eminent barristers of Edinburgh having given his opinion to a client on his case, was greatly annoyed by that client, who dissatisfied with his opinion, and anxious to obtain an opposite one, pressed question after question, If such and such had been the facts, what would your opinion have then been? and at last replied, "Had your aunt been a man would she not have been your uncle?" It was impossible to have submitted a mutual case, for who were the parties? The entire Association on the one hand, and a single Member on the other ; for the bye-law in question had been passed with unanimous approbation, and the entire Association maintained and supported it. A proposal had been made to refer the difference between Mr. Dickinson and the Council to a Committee of twenty-four Members—but where were they to get the twelve on Mr. D.'s side, when the whole Society were committed on the opposite ? The proposal was simply ludicrous. Mr. Dickinson blamed the Council severely in regard to his expulsion, and yet they had done nothing but what he himself had done, and thereby set them the example. He had seconded the enactment of the bye-laws in question, and when he was informed that he had been in error he reversed his opinion—and the Council, when they found they had been in error in reckoning the votes, reversed theirs and rectified the error they had made, and yet he blamed them ; but had the Council been as far wrong in enacting these bye-laws, and the Association in confirming them, as Mr. Dickinson alleged, could he maintain that he was thereby bound to take them into a Court of Law ? He could not, and no man could maintain that this was any part of his duty—no such obligation rested on him. If he had sought only the welfare of the Society, he might have pursued a different line of conduct. They all knew that Acts of Parliament did not necessarily carry out the intentions of those who framed them. The words did not always convey the correct meaning ; nay, sometimes they conveyed the very opposite. In such cases it was very common for parties, instead of going to law, to join in an application for an amended act. Such a course would have been much more becoming in Mr. Dickinson. He had spoken of making 1200 Members his enemies, and he felt they must be so, for he knew he had attempted to inflict on them a most wanton injury ; aye, and he had said he was proud of it. But had he joined the Council in an application to Parliament for an amended act, he would not indeed have stood in the proud position of which he now boasted, and in which he stood alone in his glory, but he would have enjoyed the respect of all his colleagues, without either suffering injury himself or inflicting it on the Society. The traps laid for the Council appeared to have caught some friends in the South ; but, nevertheless, Mr. Dickinson stood alone. Who would take a part on his Committee or support his views ? The Dover Members were great in trifles. He hoped Mr. Bottle would be returned (he had voted for him), and then they would have the benefit of his assistance, and he would see how fairly the business was conducted. Mr. Dickinson boasted that he would have returned to the Society if he had been expelled. There was no desire to expel him from the Society, but merely from the Council ; and there was no law by which the one object could be attained without the other. It was impossible to proceed satisfactorily with the business with an enemy on the Council. The mistake on the question of his expulsion being put to the vote was occasioned by one Member out of kindness abstaining from voting; the consequence was that about a third of a man was wanted to make up the three-fourths of those present, as required by the charter. He was still a Member of the Council, and if the Members approved of his hostility they might re-elect him. He

(Mr. Macfarlane) had no wish to be on the Council ; he had originally doubted the policy of electing Country Members, and argued that the opinion of a man might be conveyed by post for a penny, but it would cost much more to convey his body. His objection had been overruled, and he had served in compliance with the wishes of his brethren, though often at considerable personal inconvenience. Allusion had been made to Mr. Jacob Bell, and he would say that to no man was the Society so deeply indebted. He could not understand the object of Mr. Dickinson's hostility to the School of Pharmacy. It might be rather expensive, but was it a waste of money? He thought no money was better expended than that which was devoted to the means of raising young men by education, and giving them that status and position which a proper qualification for their business could alone afford. He hoped the school would prosper, and that its influence would extend from the metropolis as a centre, until it had raised the entire body of Pharmaceutical Chemists to the rank which the importance of their avocation entitled them to enjoy.

Mr. Sturton (of Peterborough) appealed to Mr. Dickinson's better feelings. It might be Quixotic to make the attempt, but no one knew what could be done until he tried. He appealed to Mr. Dickinson as a gentleman, a friend to science and education, desirous of raising Pharmaceutical Chemists. They had had two public expressions of opinion, they had a popular form of election. If the Council did wrong they could reject fourteen and elect others in their place; but if the opinion of one party was overruled by a large majority, it was wise to submit. There would always be opposition, and when kept within due bounds it was useful, but when no longer capable of effecting any good purpose it was worse than useless. He agreed on one point with Mr. Dickinson, that the examined Members might have reason to complain that others who had not been examined were placed on a par with them ; but this had been fully considered, and it was submitted to as a necessity for the general welfare of the Society. If the new Members should be expelled, the Council might summon them to pass a nominal examination and re-admit them, but nothing would be gained by that. Suppose the Society were to be broken up by this litigation after so many years of labour, would that be any satisfaction to Mr. Dickinson? He appealed to his feelings, and hoped he would discontinue his course of hostility.

Mr. Giles (of Clifton) said the suggestion adverted to by Mr. Macfarlane was offered to Mr. Dickinson early in the proceedings, when first a special case was proposed. He had himself suggested that an appeal to Parliament might be made for an amended Act, and this Mr. Dickinson could not deny.

The resolution was then put and carried unanimously.

Mr. Fell rose to move the resolution which he had previously read to the meeting. He said he had heard personal remarks and pleasantry, but neither would alter the facts of the case. The Society was under legal process. He did not wish to interfere with the defence or the attack, but a committee could do no harm ; quarrels were expensive, and if the two parties were brought together, it might tend to harmony.

Mr. Horncastle seconded the resolution.

Several Members made a few remarks, calling in question the utility of a committee under existing circumstances, and the meeting showing signs of impatience, the Chairman put the resolution to the vote, when it was lost by a large majority, only three hands being held up in its favour.

Mr. Pedler thought it would not be right to separate without expressing an opinion on the legal proceedings. There could be no doubt as to the importance of the question at issue, but what could possibly be gained by the success of such an attack ? Whatever might be the result, what advantage could Mr. Dickinson or the Society derive from the proceedings ? He thought it very important that the interests of the Society should be defended by every legal means, and moved,

" That this meeting sanctions and approves the conduct of the Council in defending the Society against the proceedings in the Court of Queen's Bench."

He knew what it was to be on the Council ; even in times of peace it was an anxious and arduous task. He thanked the Council for their perseverance and good temper under their late difficulties.

Mr. Boothby seconded the resolution.

Mr. Collins observed that the Council were bound to defend the Members. After what had occurred, a compromise would not settle the question.

Mr. Waugh as one of the old friends of the Society—not lukewarm, although he

had lately been out of office—expressed his cordial thanks to the Council for their steady and faithful attention to the interests of the Society. He hoped they would be spared a repetition of the annoyance to which they had been subjected. He could not think how Mr. Dickinson could like to expose himself as he did. He regretted these proceedings as much as any one, but as for the question of voting supplies, he would say to the Council, spend the last shot in the locker, *if necessary*, in defence of the Society.

Mr. HOLLIER (of Dudley) said he was not personally acquainted with Mr. Dickinson, but he had taken in his periodical, and had lent it to other Members in his locality. There was but one opinion—they were unanimous in their disapproval of his conduct and principles.

Mr. GODDARD, as the representative of the Members in Leicester, was authorised to state that they all fully concurred in the opinion expressed by Mr. Hollier.

Mr. DAVENPORT was glad to hear so decided an opinion on the part of the Members in the country. Mr. Dickinson had boasted that he was the representative of 2000 country Members, but on being taxed with it he admitted that it was only a figure of speech.

The resolution was then put and carried unanimously.

Mr. BOTTLE rose to move a resolution to the following effect—"That the Journals be transmitted to the country Members free of cost for carriage, that the services of the collector in London be dispensed with, and that the annual report of the Council be sent to the Members at least a month before the Anniversary, with the financial statement." He said he had made a similar proposition with regard to the Journals last year, but nothing had been done. When the subscriptions of town and country Members were equalised, he thought the least they could do was to place them on an equal footing so far as was practicable with regard to privileges. He thought the London collector useless. In the country the local secretaries had to perform the office.

Mr. EDWARDS, Ph. D (of Liverpool) said he would not object to second the first part of the resolution so far as related to the Transactions of the Society, but he could not support the other two propositions.

Mr. EDWARDS (of Dartford) observed that it was a mistake to suppose that the suggestion of Mr. Bottle, or any other suggestions offered at the Annual Meeting, had been neglected by the Council. They had seriously considered all the subjects, especially that relating to the transmission of the Journal. Members in the country were not aware of the obstacles, the expense, &c.

Mr. HOLLIER stated, that he had no trouble in Dudley in getting the Journal free of expense, by asking his bookseller to receive the parcel, which he did regularly, by an arrangement with the Secretary in London.

Mr. CHEETHAM said, the same plan was adopted at Nottingham, and was found satisfactory. The expense did not exceed $\frac{1}{2}d.$ to each Member.

The SECRETARY, in reply to a question, said that the expense of transmitting all the Journals by rail or post would be not less than £10 or £12 per month. He sent a few large parcels by rail. The majority went through the booksellers, as stated by Mr. Hollier and Mr. Cheetham, but in a few cases he was instructed to send them to wholesale houses in London, to be forwarded with drugs, and in these cases they were not so regular, as parcels were not always going on the right day. The postage for a single Journal was 6*d.*

The CHAIRMAN said the London Members were not all free from expense. He was on the list of London Members, although residing in the suburbs, and he had to send the carrier for the monthly parcel and distribute the Journals among his neighbours. He did not think it a hardship to perform this slight service on behalf of the Society.

Mr. BELL remarked that it would be impossible to complete the annual report a month before the meeting. It was never finally concluded until the last day, as events often occurred within a day or two which it was necessary to notice.

After a few other remarks the motion was withdrawn.

Mr. MORSON moved a vote of thanks to the Council for their services during the past year.

Mr. BOWE seconded the resolution, which was carried unanimously.

THE VOTES OF THE MEMBERS HAVING BEEN TAKEN, and twelve Scrutineers appointed, the Chairman was about to adjourn the meeting, when Mr. Dickinson handed to him the following letter :—

"*To the President and Council and Secretary or Registrar of the Pharmaceutical Society of Great Britain, or to whom else it may concern.*

GENTLEMEN,—On behalf of Mr. Wm. Dickinson, we hereby give you notice, that no person who is not a legal Member of the Society, can vote for the election of Council, or in any manner interfere with the proceedings of the above-named Society, and that any vote of persons who have been improperly placed on the 'Register of Members' ought not to be taken, and on behalf of Mr. Wm. Dickinson, a Member of the said Society, we hereby protest against your taking the vote of any person who has been admitted on the Register of Members since the date of the Pharmacy Act, without such person having previously passed an examination.

We are, Gentlemen, your obedient Servants,

PRICHARD AND COLLETTE.

57, *Lincoln's Inn Fields*, 18*th May*, 1854."

The meeting was then adjourned until Monday, the 22nd instant, at 11 o'clock.

SPECIAL GENERAL MEETING.

May 18.

THE PRESDENT IN THE CHAIR.

THE CHAIRMAN observed that the business of the Meeting would not occupy much time, as it was simply the confirmation and approval of an alteration in the date of a bye-law the necessity of which was generally understood.

Mr. PEACOCK moved, and Mr. WATTS seconded, the confirmation and approval of the following bye-law, the word *December* having been substituted for *July*:

"7. All Members being such prior to the 1st of December, 1853, not being Life Members, shall pay an Annual Subscription or Registration Fee of One Guinea, or in lieu thereof, the sum of Ten Guineas as a Life Member's Subscription."

The motion was put, and carried unanimously.

Mr. HALLOWS moved a vote of thanks to the Chairman, which was seconded simultaneously by several Members, and carried unanimously.

ADJOURNED ANNUAL GENERAL MEETING.

Monday, May 22.

MR. H. DEANE, PRESIDENT, IN THE CHAIR.

MR. HUMPAGE, the Chairman, presented the following

REPORT OF THE SCRUTINEERS, *May* 19*th*, 1854.

WE, the undersigned Scrutineers, appointed at the Thirteenth Annual General Meeting of the Pharmaceutical Society of Great Britain, held on the 18th day of May, 1854, do hereby certify that we have examined the papers of 1056 Members.

The approved votes amount to	991
Voting papers with surplus numbers	27
" " names not erased	3
Papers not being votes	35
	1056

The votes respectively given for the several candidates are as follow :—

Bell	837	Garden	565	Banks	231	Tustin	111
Hanbury	703	Morson	539	Palk	211	Greenish	106
Herring.....	701	Bucklee.....	531	Smeeton	202	Morgan.....	103
Davenport	683	Bird	523	Bottle	197	Moody	89
Deane	678	Sandford	437	Large	188	Warner.....	84
Macfarlane ...	663			Allchin	166	Long	77
Hooper	621	Goddard	275	Hollier	166	Wyman.....	64
Southall	599	Cubitt	268	Dickinson.....	161	Peacock	58
Gifford	584	Deck	249	Tylee.....	149		

The five Auditors were unanimously elected.

(Signed) BENJAMIN HUMPAGE, *Chairman*. WM. ASHTON.
JOHN R. COLLINS. EDWARD CONSTANCE.
JOHN PEPPER. WILLIAM WALLS.
CHARLES CROYDEN. WILLIAM BOLTON.
JOHN J. FENN. WILLIAM BASTICK.
THOMAS R. GOODBARNE. THOMAS HYDE HILLS.

The CHAIRMAN then announced the names of the Members of Council and Auditors for the ensuing year, as follows :—

BELL, JACOB, 338, Oxford Street.
BIRD, WILLIAM L., 42, Castle Street, Oxford Street.
BUCKLEE, WILLIAM H., 86, New Bond Street.
DAVENPORT, JOHN T., 33, Great Russell Street, Bloomsbury.
DEANE, HENRY, Clapham.
EDWARDS, GEORGE, Spital Street, Dartford.
EDWARDS, JOHN BAKER, 42, Berry Street, Liverpool.
GARDEN, FELIX R., 372, Oxford Street.
GIFFORD, JOSEPH, 104, Strand.
GILES, R. W., 52, Royal York Crescent, Clifton.
HANBURY, DANIEL BELL, Plough Court, Lombard Street.
HERRING, THOMAS, 40, Aldersgate Street.
HOOPER, WILLIAM, 24, Great Russell Street, Covent Garden.
MACFARLANE, JOHN F., 17, North Bridge, Edinburgh.
MORSON, T. N. R., 19, Southampton Row.
MURDOCK, WILLIAM, 113, Union Street, Glasgow.
SANDFORD, GEORGE W., 47, Piccadilly.
SQUIRE, PETER, 277, Oxford Street.
SOUTHALL, WILLIAM, 17, Bull Street, Birmingham.
WATTS, JOHN, 107, Edgware Road.
WOOLLEY, JAMES, 69, Market Street, Manchester.

AUDITORS.

BOLTON, WILLIAM, 146, Holborn Bars.
HALLOWS, WILLIAM, 2, Clark's Place, Islington.
HILL, ARTHUR BOWDLER, 11, Little Britain.
WARD, FRANCIS, 14, Grosvenor Street West.
WRIGHT, WILLIAM VALENTINE, 11, Old Fish Street.

The CHAIRMAN thought the result of the election might be taken as satisfactory evidence of the confidence of the Members generally, and their approval of the endeavours of the Council to discharge their duty under the difficulties they had to contend with. He hoped the prosperity of the Society would be secured by the restoration of harmony, and that the Council would be enabled to perform the duties of their office without further interruption or annoyance. The Chairman also referred to the letter which had been handed to him by Mr. Dickinson at the close of the meeting on Thursday, objecting to the votes of certain Members, which letter, Mr. Dickinson told him, had been intended to be served by his solicitors on the following morning, but he thought he might as well deliver it then and there to save trouble. He observed that no importance could be attached to that document. If it had been intended for any good purpose, it would have been delivered before the votes had been taken. In that case the responsibility would have been thrown upon the meeting. But after the votes were taken and mixed in the ballot-box, those which were objected to could not be separated from the others, and the delivery of a notice not to take votes, which notice the party had kept in his pocket during the time the votes were being taken, could only be regarded as an attempt to cause embarrassment and confusion. It would not, however, have that effect, as all the parties voting were Members unless and until they had been removed by a legal decision. In the House of Commons a member whose seat was disputed was held to be a member until the committee reported that he had not been duly elected, and such report did not invalidate the previous proceedings of the House in which he had taken a part.

A few observations were made by other Members concurring in the sentiments expressed by the Chairman, and a vote of thanks to the scrutineers having been carried unanimously, the meeting separated.

PHYTOLOGICAL CLUB.

May 10*th*, 1854.

MR. GREENISH IN THE CHAIR.

The Candidates proposed at the last meeting were unanimously elected Members of the Club, and a further accession of Members from different parts of the country was announced.

Mr. Greaves announced the receipt of specimens of the rare *Draba aizoides* from Mr. Gissing, of Worcester.

Mr. Cort exhibited a curious specimen of *Hymenophyllum Tunbridgense*, and some specimens of Pennywort or *Cotyledon*. The plant however, not being fully in flower, its further consideration was adjourned to the next meeting.

The Secretary read a communication from Mr. Gissing of the proceedings of the Worcester Branch of the Phytological Club.

The Rev. J. H. Thompson, Hon. Member of this Branch, had discovered another undoubtedly wild habitat for *Galanthus nivalis* at Breedon, in Worcestershire, as well as a genuine habitat for the *Daphne Mezereum*. The early season, although warm, had been very dry, and had produced very few spring flowers. The hawthorn had been in blossom so early as the 14th of April.

Edwin Lees, Esq., F.L.S., Hon. Member of the Club, had delivered a lecture on "The Geography of Plants" to the Members of the Worcester Branch, at which there was a large attendance,

We regret that our space will not admit the publication of the lecture.

The Meeting was then adjourned to Wednesday, June 14th.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, April 21*st.*

MR. RAWLE, PRESIDENT, IN THE CHAIR.

Dr. Nevins delivered a lecture on "The Characteristics of Quinine and Quinidine." He said, in bringing this subject before the meeting, he regretted he should not be able to present any very striking facts, or to communicate any tests of such decisive and easy application, as to enable the Members to ascertain with readiness and certainty even that quinidine is present, much less could he state any unexceptionable method by which its amount might be readily ascertained. He regretted also that much time would be occupied in pointing out the inaccuracies, real or apparent, in various tests which had been proposed for ascertaining the purity of quinine; but in doing this he did it with the hope that the defects in these tests might be shown to be apparent rather than real, and to arise from the omission in the description of some small matter of detail or point of manipulation, rather than from inherent defect, as every Chemist must be aware how often a really good test fails, from the omission of some little matter of detail in the description, which has appeared self-evident to the proposer of it, and so has escaped mention. He did not propose to occupy the attention of the meeting with such adulterations as were fraudulent in every sense, both medicinally and commercially, such as starch, sugar, sulphate of lime, &c., but rather with those admixtures, viz., salicine, cinchonine, and especially quinidine, which possess medicinal properties similar to those of quinine, but are still frauds, because their price and value are inferior to those of the pure alkaloid. The first test he should mention was that proposed by Mr. Barry, in the fifth volume of the *Pharmaceutical Journal*. It is based upon the assumption, which was true at the time he proposed it, that all the probable adulterants were readily soluble in cold water, and it is so simple and elegant, that a feeling of regret naturally arises to find it open to considerable error. Mr. Barry says, "Take 12 grains of pure sulphate of quinine, and dissolve them by the aid of heat in 3500 grains of water. When the solution has become perfectly cold only a few feathery crystals will remain at the bottom of the bottle undissolved. Then take the same weight of the suspected salt, and dissolve it in the same quantity of water; if it remains *perfectly* dissolved it shows that the sample has been too soluble,

therefore add another grain ; and if it leaves about the same amount undissolved as the pure sample did, it will show that there have been 12 grains of sulphate of quinine in 13 grains of the adulterated compound. If, however, the 13 grains are perfectly soluble, add another grain, and so on." This test depends upon the pure sulphate of quinine being soluble in 291 parts of water, but Dr. Nevins took six grains of Howard's sulphate, and showed that they were not *perfectly* dissolved in 3500 grains of cold water, instead of that quantity of water being sufficient for 12 grains, as assumed in the test.

As a test for quinidine, it answered for 14 per cent., but failed when the proportion of quinidine amounted to 20 per cent., and beyond this it fails completely. In making this statement, however, the original error of taking 12 grains instead of six, for 3500 grains of water, must be corrected. It must not be forgotten, that quinidine was unknown when the test was first proposed.

The next test mentioned was Schweitzer's ether test for cinchonine, which is very simple and correct. It depends upon the solubility of quinine in ether, but the insolubility of cinchonine in that liquid. On putting some sulphate of quinine, purposely mixed with sulphate of cinchonine, into a test tube, dissolving it in water by the addition of the smallest quantity of dilute sulphuric acid, and adding equal parts of liquor ammoniæ and ether mixed together, both the alkaloids are precipitated, but on shaking them up, the quinine is dissolved at once, but the cinchonine remains perfectly insoluble at the line of separation of the two fluids. Now a very similar test has been proposed by Mr. Robert Howard for the detection of quinidine, an account of which may be found in vol. xii. of the *Pharmaceutical Journal;* but Dr. Nevins stated that in his hands it had always failed, perhaps from some error of manipulation ; and on performing this experiment before the meeting with quinine purposely mixed with ten per cent. of quinidine, the whole was redissolved, as if pure sulphate of quinine had been employed. In connexion with this test, the lecturer observed he had found quinidine much more soluble in ether than it was usually represented to be. Pereira states that it requires "about 142 parts of ether at 62° F.," *Mat. Med.*, 3d. edit., p. 1656 ; and Van Heijningen that it requires about 90 parts, *Ph. Journ.*, 1849—50, p. 325. But Dr. Nevins took the washed precipitate from 15 grains of Herring's sulphate of quinidine, which amounted to nearly eleven grains of the alkaloid, and it was almost perfectly dissolved by f ʒij. of rectified ether, which is less than 10 parts, instead of 90 or 142. In reference also to the statement that it readily crystallizes from its ethereal solution, some of the solution was evaporated upon a watch-glass, but the alkaloid remained in a perfectly amorphous state, and in some which had been prepared in the same way several days previously, no crystalline form was perceptible.

As a means of detecting any considerable admixture of quinidine, the lecturer referred to Zimmer's test, *Ph. Journ.*, vol. xi., p. 393, as the best and easiest of application that he was acquainted with; but he showed that even with that test it was difficult to pronounce with any certainty upon the presence of five or six per cent. of quinidine, beyond what is met with in the purest commercial sulphate of quinine. All the experiments were performed with Howard's sulphate of quinine, and Howard's and Herring's sulphate of quinidine.

Dr. Nevins next alluded to a test proposed by Mr. Robert Howard, *Ph. Journ.*, vol. xi., p. 393, in which he says that 100 grains of sulphate of quinine are dissolved by f ʒvij. of boiling water, whilst *eight* hundred grains of sulphate of quinidine are soluble in the same amount of water. This the lecturer thought must be a misprint, 800 having been printed instead of 300 ; for the first quantity was not dissolved, whilst he found that the latter was.

Dr. Nevins concluded by referring to several other tests, none of which he regretted to say were positive in accurately distinguishing between quinine and quinidine. He also referred to the formation and peculiar properties of Herapathite, or the iodo-sulphate of quinine, several specimens of which, as well as samples of pure and adulterated quinine, he showed under the microscope.

With regard to the employment of salicine as an adulterant of quinine, it was very readily detected by the addition of a few drops of concentrated sulphuric acid to the suspected sample, when, if salicine were present, a blood-red colour was produced, two other substances only, viz., veratria and piperin, producing the same reaction ; but the presence of salicine might be corroborated by adding to the salt a small portion of bichromate of potassa and sulphuric acid, and heating, when, if

salicine was present, the peculiar odour of hydruret of salicyle, or oil of meadow sweet, was distinctly perceptible.

The interest of the lecture was considerably increased by its being illustrated with a large number of experiments. A vote of thanks was unanimously passed to Dr. Nevins, and a very interesting discussion on several of the tests referred to, was joined in by most of the Members present.

Mr. Abraham then brought before the meeting the subject of the decimal currency, and proposed that a petition, signed by Members of the Association, be presented to Parliament in its favour. The motion was seconded by Mr. Sumner, and carried.

It was announced that the next lecture would be delivered by Dr. Brett, on some original and important reactions of the vegetable alkaloids.

THE MANCHESTER CHEMISTS' AND DRUGGISTS' INSTITUTE.

The Committee have made arrangements with Daniel Stone, Esq., F.C.S., Analytical and Consulting Chemist, to deliver a Summer Course of Lectures on Chemistry, and with A. Somers, Esq., M.R.C.S. Eng., L.A.S., and Lecturer upon Materia Medica at the Chatham Street School of Medicine, to deliver a Summer Course of Lectures on Materia Medica at the Rooms of the Society, Wellington Chambers, Victoria Street. Mr. Stone delivered the Introductory Lecture on Tuesday, the 9th of May, to upwards of fifty Members and pupils of the Society; and Mr. Somers on Friday, the 12th of May, to a very crowded and attentive audience.

Examinations will take place at the conclusion of the Lectures, and Prize Tickets awarded to the most competent, enabling them to attend a systematic course of laboratory practice at the laboratory of Mr. Stone in Oxford Street.

The Committee have great pleasure in stating that the very great success attending this their first efforts for extending education, have determined them to make arrangements for the delivery of a more extended course of lectures upon Chemistry for the next Winter.

John Hamer, *Hon. Sec.*

ORIGINAL AND EXTRACTED ARTICLES.

STUDY.

BY MR. JOSEPH INCE.

Half the intellect of London has arrived there with a few shillings and a carpet-bag. Its great writers, statesmen, merchants, adventurers of every kind, down to its great Chemists, have travelled on the same stage-coach. Family distress, narrowed opportunities, and sometimes actual want, have been the best heritage of many of our illustrious men. It is for us with a laudable ambition to follow their example, and to act in our turn as they have done before; in furtherance of which object a theory is offered, and its practical results worked out, addressed exclusively to those assistants who have little time, no competent advisers, and no friends. Such an one on first being introduced to the subject, would infallibly remark, "These excellent discourses read very nice on paper, difficulties surmounted make great men, but I am nothing but a Druggist's assistant; I have early and late hours, while my time is not my own. The tide of fortune might roll my way in vain, for I have business to attend to, pills to roll out, and physic to make up. Besides, I have a strong notion that retail Pharmacy contracts the mind; drugs and success in life form no amalgam. If some good friend would kindly leave me a legacy, or people have no medicine after eight o'clock, I might perhaps then read a little, do something, and improve." Of course after this statement you naturally feel better, so now will you just let me give you my quiet mind. What makes success? and who are the men who gain it? Every one knows who fail. Give a man plenty of time and sufficient money, and he will in general make no use of the first, and waste the second. Great natural opportunities, an easy access to society, friends, a crowd of

teachers, a ready-made position involving no struggle, and no anxiety, shut out for ever the most distant hope of extrication from such a Capuan luxury. It is a fatality to be born with white kid gloves. To all this there are bright exceptions, but so few that they only prove the rule, nor do these remarks apply to hereditary rank, where habitual cultivation and contact with elevating circumstances produce noble specimens to the contrary. The past is the great teacher for the present, nor is there a more consoling thought, than that what man has done, man may do. Physic has not the contracting influence you imagine. An assistant like yourself, while in a suburban district, managed to become as brilliant in literature as he now is high in law, and it needs some self-denial, on the part of the writer, to refrain from citing endless instances.

So much for intellect. Infinitely more to the purpose it is to know, that those who never left their original calling, succeeded in it with no greater advantages than you possess. The names best known are the most appropriate illustrations, though personal mention would be both invidious and indelicate. All first-class Chemists' establishments are now so interwoven and associated with daily city life, that each separate firm, with its owner and reputation, seems part of the current course of events. But there was a time when these very houses were not in existence. Their directors were hard-working, persevering, determined assistants, with not a tithe of the advantages of the present day. Education had to be dug up. The scanty Latin of their youth was mystified in an unintelligible grammar, which has only been swept away within the last few years. Greek was considered a language well adapted to the Athenians, and an austere schoolmaster who taught for his salary, was not likely to awaken a strong interest in general knowledge. After this pleasant commencement, the young beginner was apprenticed to a Chemist, because his parents thought it *such a nice clean business;* accordingly, the Tyro found himself immediately smothered up to his eyes in white, red, and blue paint, not unlike the clown at Astley's, happy to present himself to society, not too redolent of varnish, and, having escaped the oil-can on the one side, and the black-lead on the other, allow a comprehensive apron to cover all deficiencies for seven long years. He then came to London. No institution taught him anything, no good and cheap books instructed him. There were museums for surgery, anatomy, and geology, but none for him; there was less time than there now is, and rougher work. What then? The battle of life was before him, and he won it. Success, almost barricaded, was carried by assault. Fame was not an heirloom in the family, it was gained slowly but surely. The shop, though draughty enough in all conscience, was never favoured by some special gale from heaven which swept in the customers, advertised the drugs, and improvised a reputation, yet somehow or other the new house and its owner by degrees gained itself a name, passed into a household word, and became as well known as St. Paul's Cathedral.

Study was the talisman which wrought the enchantment. One hour a day devoted for three years to regular, uninterrupted, systematic reading would enable you to reach the limits of your ambition. Three years! what an age! But unimproved or not they *will* go all the same, so why not make the best of them in passing? The sole question is, can you get one hour? Such is the internal constitution of some houses that it is quite impossible. On this subject we are fearful of being led astray by temporary excitement, which would gain no object, but simply create annoyance. We believe it to be the interest of none but the gas companies to commence business before the day-dawn, and protract it beyond the dead of night. It is the interest of masters to have the cordial sympathy of their assistants, and not their unwilling services. It is the interest of the public to be served by an intelligent being, and not by a spectral incompetent. It is the interest of the assistants to have the requisite time for improvement here, and the opportunity for attending those sacred duties which are to fit them for hereafter.

Now for a few practical details:—Ten pages can be well read in one

hour. "Why bless us all, I can read fifty without the slightest trouble—thirty at least." In "bless-us-all gentlemen" we have little confidence; the first month finds them at work like a steam-engine, the second at the bottom of their beds. They are like those remarkable young ladies who *learn* French in three months, pick up Italian on their way, and take German at a hand-gallop—a process which causes a slight embarrassment to the respective natives.

Returning to the decimal system, which is after all the best, a short tabular view may tend to enlighten the subject. One month contains in round numbers thirty days, consequently ten pages every morning would be 300 pages a month, from which the following *average* result might ensue:—

Pereira's Materia Medica	1900 pages	6	months.
London Pharmacopœia	550 "	2	"
Christison's Dispensatory	950 "	3	"
Thomson's Dispensatory	1150 "	4	"
Brande's Chemistry	1500 "	5	"
Turner and Liebig	1250 "	4	"
		2	years.

The whole of these are books of general reference.

Supposing that one hour would only master six pages a day of Chemical works requiring more than ordinary attention, then 180 pages would be read each month, and 2160 pages in the year, which would include the following:—

Fownes' Chemistry	550 pages.
Gregory's Outlines	560 "
Royle's Materia Medica	700 "
Fresenius' Analysis	350 "
	2160

Nothing now remains to make this table accurate but to correct for pressure of time and density of head.

It will not be supposed for a moment that the mere reading of these books will constitute a well-grounded acquaintance with their contents, but the list shows that there is a possibility of accomplishing far more than is generally supposed in a very limited space of time. Few, indeed, would have the courage to drag through some of the ponderous volumes enumerated, nor would such a herculean task be advisable. Such calculations are necessarily imperfect, though useful, as there may be interfering circumstances, over which there is no control. Sickness will sometimes throw its shadow over the brightest hopes. It may be a fancy, but we have always felt the toilsome nature of unassociated Chemistry, and therefore suggest the following plan:—

Allow one hour, every other day, to the consecutive continuous reading of *one* outline work, by which means you would triumph over 150 pages a month, and 1800 pages in the year.

It is usually desirable not to pore over the same manual too often, after having once carefully perused it, but to commence another, which, though treating on the same subject, is expressed in different words. There are few introductory treatises of more than 600 pages each.

At the same time it is well to know that an occasional dip into one book, varied by a short reading of another, a snatch of Brande, a glance at Daniell, a look into Fownes, and a general survey of Gmelin, Parkes, or Faraday, will consume the same amount of time, and lead to nothing.

No one can hide from himself the absolute necessity at the present day of being acquainted with at least the elements of French and German. The two languages have become of trade importance, to say nothing of any intellectual enjoyment they may afford. That time will be well spent that is devoted for three alternate mornings to the hard study of the first. Now our imaginary Assistant looks unwell, and delivers himself as follows:—"Yes, very good, if I

had learnt at school, but they taught nothing there but Latin, of which I only recollect the first page of Cæsar's Commentaries. It would cost two or three guineas a quarter for a master, and I should be ruined in grammars, dictionaries, and books of reference; besides which you can never persuade me that I can learn French in one hour a day." No, very likely not, but you will soon convince yourself of that important fact. Perhaps you have seen the title of a pamphlet, "Plenty of Work and how to do it." The *modus operandi* is as follows:—Buy a Cobbett's Grammar. Read it through and through until its chapters are burnt into your mind, and when the excitement of a new impulse ceases, wade through its dreariest details with still untiring energy. London is a wide place, containing all sorts of people, nor is there any difficulty in meeting with Frenchmen as acquaintances. More could be learnt from them in casual intercourse than by any other means. From hence you cannot move a step without a teacher; no very alarming undertaking, as the slightest arrangement with two or three others similarly disposed would secure his services at a trifling cost, while to those living in the City, opportunities obtrude themselves unsought. Having gone thus far, Devotion would suffer little were you occasionally to attend the services of a foreign church.

The first year closes, during which a good insight into Elementary Chemistry has been gained, as well as a tolerable advance into the rudiments of French. Union is strength, and on this principle some book should occupy the second year which contains the best combination of Chemistry, Pharmacy, and Materia Medica; of which perhaps there is no better specimen than Pereira's *Elements*. If it be possible, borrow it; if not, club together and buy it, for it must be had. The three alternate days still remain for disposal. For the second year it would be an useful variety to allot one hour a week to German, the other two being claimed by French as usual. One of the best Grammars is by Dr. Tiarks, price six shillings; but Dictionaries, Manuals, and all sorts of foreign books may be picked up for a very little at a bookstall. Personal reserve is the only hindrance to companionship with some of the numerous resident Germans. Need it be mentioned that the best aid to study is at your own disposal. Buy any foreign work and its English version, then constantly translate and retranslate alternately from one to the other, correcting your attempts afterwards by the book in hand—for instance, *Les Confidences*, by Lamartine, or *Undine*, by De La Motte Fouqué. Children's books are not to be despised; they are at first of greater service than Racine or Schiller.

The prospect brightens as the drudgery of elementary study is gradually left behind, and on the third year it would be no presumption to enter at once on those works in which the first principles of Pharmacy are carried out to their legitimate application, such as Watson's *Principles and Practice of Physic*, or Bowman's *Practical and Medical Chemistry*. Perhaps now is the best opportunity of understanding and tracing out the different preparations included in the various Pharmacopœias, for which the summary presented by Mr. Squire will be no small assistance. The two languages may also be studied together, but by this time they will have become an integral part of reading, not a separate branch. To gain this point will amply compensate for the hardships of the struggle, nor can we express a kinder wish for the student than the inheritance of such joy, recollecting that a contented mind is a continual feast. All this may be realized by one hour's application. Botany has been intentionally omitted, as it requires for its right study ample leisure and out-door speculations. To those gentlemen who have time at their own disposal, who have free access to museums, libraries, and lectures, and are surrounded by all the appliances of learning, these remarks may seem absurd; but they are intended alone for those who have very scanty time and most limited opportunities. Weary, indeed, beyond description, is the manual occupation of ignorance. Can there be a harder fate than with an empty mind to associate with a row of monotonous bottles, a gas-jet, and unmeaning implements of coction? If you but knew the

heaven you could create within you by this practice of habitual study! Knowledge turns the meanest circumstances into sources of enjoyment. Under such influence the solitary chamber brightens up, the charm of the Casino fades, and an inward satisfaction finds its expression in acts of good-will and courtesy in daily life.

31, *Southampton Street, Covent Garden.*

OBSERVATIONS ON THE SPECIMENS OF PERUVIAN BARK PRESENTED TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY, MAY 17TH, 1854.

BY MR. JOHN ELIOT HOWARD.

No. 1 is a Loxa bark, much valued in commerce, and imported to a considerable extent, which appears to be the same as the "*amarilla del Rey*" as shown in No. 35 of the collection of Pavon in the British Museum, and yet more in the specimen of woods, No. 20, which has this peculiarity, that whilst the diameter of the branch from which it was cut is two-and-a-half by two inches, the bark itself is as thin as a wafer. This very thin bark when peeled, curls in upon itself in drying, and as the shrub, according to Pavon, is only about three yards in height, it seems never to attain any considerable thickness. It forms a very pretty looking bark, distinguished by the above characteristics, and by the bright yellow colour of the internal surface. It is the bark described by Pereira under the head (*a*) of page 1639, vol. ii., part ii., *Elements of Materia Medica*. The liber presents remarkably under the microscope the amygdaloid appearance of its inner surface mentioned by Pereira, page 1619 of the same work.

Pavon says of the "*amarilla del Rey*," that "this bark *detaches easily from the wood*, and that the most experienced barkers distinguish it by this separative character." This peculiarity is very noticeable in the bark under review, which always appears to have peeled easily, and to have consequently a very smooth and even inner surface. "Some days after its extraction it is not to be distinguished from that of No. 2 (the colorada). When it is fresh gathered, the colour of the internal surface is of a greenish-white, which soon changes into a faint yellow, augmenting in intensity until the desiccation is complete." (Lambert's *Illus.*, p. 64.) Some specimens in my possession appear to me to have become much more of an umber tint on the inner surface since they came into my hands.

The deep yellow colour manifests itself in the liquors when the bark is under examination. I did not find either this specimen or No. 3 rich in alkaloids, but both contain abundance of cincho-tannic acid.

No. 2 is a Loxa bark, which agrees in appearance with the "*colorada del Rey*" of Ruiz and Pavon, as shown in the specimen of bark No. 33, and of woods, No. 31.

Pavon says of this bark, "at the moment of extraction, this bark assumes internally the colour of saffron, though rather livid. During desiccation, its colour heightens, and approaches more or less to that of Ceylon cinnamon. The trunk is generally single, and covered with a *rather rough bark*. This bark adheres more to the wood than the former, but is more compact," &c. (See Lambert's *Illus.*, p. 64.) It is richer in alkaloids than the amarilla, affording me, on examination—Quinidine and uncrystallized quinine 1.57, cinchonine 0.37, total 1.94 per cent.

No. 3 is a Loxa bark, which seems to me to resemble the "*colorada de Loxa*" of Pavon, as shown in the specimen of woods, No. 33. It is remarkable for the roughness of the bark, and for the quantity of red colouring matter which it contains.

It seems to be a variety of C. Condaminea, resembling most the Uritusinga.

No. 4 is a Loxa bark, which I have compared with the *Chaharguera* sort

in the Museum, which was not only considered one of the most valuable kinds, but had the reputation of having cured the Countess of Chincon.* The present specimen yielded me per cent.:—

Quinidine	1.67	2.98
Uncrystallized quinine	0.63	
Cinchonine	0.68	

It is therefore a rich bark, and one which must nearly equal in efficacy (when given medicinally) much of the quill bark imported from Bolivia as Calisaya, which is almost always a mixture of different species, some of them very inferior, and the average product is not greater (as to the sum of the alkaloids) than the above amount.

M. Jussieu called one of his sorts of Loxa bark the "knotty" (*noueux*), which must be this, if one may judge by the appropriateness of the term.

No. 5 is probably a kind of *Casc. Provinciana*, and the produce of C. micrantha.

I have ascertained by recent inspection of Dr. Weddell's specimens at Paris, that his variety, β oblongifolia, is the same as the micrantha of Ruiz and Pavon, and the origin of these Peruvian varieties, whilst the *a* rotundifolia produces a Bolivian bark of richer colour, and I think more abundant produce in alkaloids. The present specimen gave me per cent.:—

Quinidine and uncrystallizable quinine	1.43	2.72
Cinchonine	1.29	

No. 6 is also I think, the produce of C. micrantha, β oblongifolia, Weddell. It appears to me on comparison, to be identical with the specimen of *Pata de Gallinazo*, 1*a* Esp. No. 50 of the B. M., and with a like specimen of Poeppig's in the Pharmaceutical Society's collection. It yielded me per cent.:—

Quinidine and uncrystallizable quinine	1.00	2.09
Cinchonine	1.09	

No. 7 has some resemblance to No. 39 B. M., called C. sp. nova de Jaen de Loxa, but is more exactly like a specimen in the Pharmaceutical Society's collection, named *Huamalies* by Batka. It contains per cent.:—

Quinidine	0.80	1.54
Cinchonine	0.74	

No. 8 is I think the same with specimens of "Huamalies rougeâtre" in my possession, and when compared with the specimen of woods, No. 37 B. M., seems to accord perfectly. I should therefore think it the Amarilla de Loxa, and from its general resemblance to specimens of the bark of C. pubescens, I should assign it to this origin. It gave me per cent.:—

Quinidine and uncrystallizable quinine	1.03	1.92
Cinchonine	0.89	

The separation of the alkaloids was effected by means of pure æther. The *uncrystallizable quinine* may be considered identical with the *amorphous quinine* of Liebig. The quinidine is a product common to almost every species of cinchona, and is found in these barks of Peru, in those of Bolivia (including the Calisaya) and in those of New Granada.

MANUFACTURE AND CONSUMPTION OF QUININE IN THE UNITED STATES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—An article in your last number on the Manufacture and Consumption of Quinine in the United States, claims notice, from the circumstance of its

* "The sort which Ruiz, in his unpublished memoir before quoted, calls Cascarilla Chauharguera, and which he says is not only *one of the most valuable* kinds, but to which the tradition attaches among the bark gatherers of Loxa, of having been the identical bark sent by the Corregidor Don Francesco Lopez Canizares, in 1638, to the Viceroy of Peru, the Conde de Chincon."—*Lindley's Flora Medica*, ed. 1838, p. 415.

appearing in a journal of so much authority as yours. In its original form of a letter to a newspaper, it would have been noticed only as an advertisement, but as it raises a question affecting the European makers of this important medicine, I hope you will allow me space for a few observations.

The different medicinal effects of the alkaloids obtained from cinchona barks (I refer especially to quinine, quinidine, and cinchonine) deserve a more careful study than has yet been bestowed upon them, in this country at least.* Results well worth the trial might also be obtained by their exhibition in combination, as is so often practised with other medicinal substances. The barks most valued for medicinal use as such, vary greatly in their active constituents. The species which first came into notice (cinchona condaminea) is extremely rich in alkaloids, containing large quantities of each of the three above mentioned, besides their uncrystallizable modifications.

In the mean time one very important principle must by no means be lost sight of, that a practitioner should always know what he is administering, and on this ground the substitution of even a more efficacious remedy under the old name would be totally unwarrantable.

To turn then to the question of quinine as at present in the market.

I should observe that it is only the genus Cinchona, as defined by the accurate and indefatigable Mr. Weddell, which has been proved to afford any of the above-mentioned alkaloids, the genera most nearly allied, and which at first sight resemble the cinchona most closely, being apparently quite destitute of them. Of this genus the species and varieties are extremely numerous, and all investigation only brings continually new ones into view.

The "Monopoly," or best Bolivian Yellow Bark, consists of two at least, and probably three, distinct species, of nearly equal commercial value, besides an occasional admixture of spurious sorts. These species are the Cinchona Calisaya (three or four varieties), Boliviana, and ovata, var. rufinervis. These all contain quinine, quinidine, and cinchonine, but the two latter alkaloids in small quantity. Other species present them in very different proportions, sometimes one, sometimes another forming the chief part of the febrifuge constituents. In some the bitter taste of the bark appears to be due, not to any of these, but to a curious acid, the kinovic, which, like the fatty acids, is very sparingly soluble in water, but possesses a strong bitter taste, especially when combined with alkalies.

It is obvious that the extraction of the quinine from these barks may be much more troublesome in one case than in another; but, in the first place, *the quinine contained in them is identical in all.* I do not speak only of its giving identical results by ultimate analysis—all its chemical properties—its solubility in a certain quantity of hot or cold water, æther, alcohol, and other solvents—its behaviour with different reagents—its powers of forming the artificial tourmalines, discovered by Dr. Herapath, and of giving the other optical results which have justly gained an European celebrity for their discoverer—its physical properties of taste, form of crystal, &c., all are precisely identical, from whatever species obtained. In fact, it would be as "scientific" to question whether gold from California and from Australia were the same thing, because one was found in combination with more silver than the other, as to admit the doubts suggested by the paper to which I refer.

Secondly. No very delicate operations are required to separate these alkaloids, so as to obtain each in a state sufficiently pure for all practical purposes.

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* I beg to refer to a very laborious and valuable work published last year by M. Briquet, "*Traité Therapeutique der Quinquinia et de ses Preparationes.*" This author, however, was not acquainted with quinidine. He estimates cinchonine as one-third or one-fourth weaker than quinine, a result which he says is confirmed by observers, who have been obliged to give sixty to eighty centigrammes of cinchonine, to arrest fever which would have yielded to forty or fifty centigrammes of sulphate of quinine.

Thirdly. The tests in common use, already described in your Journal, are amply sufficient to ascertain whether the care needed to secure this result has been taken in the manufacture.

I remain, yours respectfully,

ROBERT HOWARD.

ON THE MANUFACTURE OF ALUM AND SULPHATE OF ALUMINA.

(*Continued from page* 626.)

Manufacture of Sulphate of Alumina from Cornish Clay. Weissman's process (Nov. 16th, 1839).—Take potters' clay as free from iron as possible, and calcine the same to a moderate red heat, in order, as much as possible, to drive off its moisture. The clay so calcined, is next to be ground to powder and placed in leaden pans, heated by a moderate fire or by steam, when sulphuric acid of sp. gr. 1.2 is to be applied in sufficient quantities that nearly the whole of the alumina shall be dissolved out. It is preferable to leave a small portion undissolved, as a saving of acid is thus effected. The mass in the pan is to be stirred until dry, when boiling water is to be added in quantities sufficient to dissolve out the whole of the sulphate of alumina formed. The successive washings thus obtained are next mixed together in vats or other suitable vessels, and left until perfectly clear. A measured quantity of the liquor is then to be tested with a known quantity of solution of prussiate of potash or other suitable re-agents, to ascertain the quantity of iron contained in such measured quantity of liquor; then the measure of the whole quantity of liquor being known, the quantity of iron therein may readily be ascertained by calculation, and a suitable proportion of solution of prussiate of potash being added, the whole of the iron is precipitated in the form of Prussian blue. The liquor is now allowed to clear by subsidence or filtration, when it is quickly boiled down in large leaden vessels and run off at the proper density into shapes, when it cools and acquires a solid consistence. In this condition it is obtained as a sulphate of alumina with free alumina, and is usually met with in commerce in square plates of about one inch in thickness, white, and nearly translucent, but having no appearance of crystallization.

Dr. Richardson found it to consist on analysis of—

Sulphuric acid	35.96
Alumina	14.25
Lime	traces
Magnesia	traces
Water	48.05
	98.25

Mr. Hervey's process (date of Dec. 13, 1839) for obtaining alum from clay, is as follows :—He takes clay as free from iron as possible, and containing the largest quantity of alumina. This clay is then dried and afterwards ground, and passed through a fine sieve. In this state it is put into a reverberatory furnace, and then calcined at a moderate red heat; it is then drawn out of the furnace, and allowed to cool. After this it is put into leaden cisterns, and sulphuric acid diluted to from 10° to 80° Twaddle is added to the extent of from one-half to the entire weight of the clay used, according to the quality of the clay employed. The sulphuric acid and the clay are then to be well stirred and mixed together, when a great ebullition ensues. After this has subsided, the mixture is to be again well stirred, and water, cold or hot, is then gradually added to extract or separate the sulphate of alumina thus formed. The mixture is then allowed to settle for about forty-eight hours, when the undissolved portion of the clay falls to the bottom, leaving the sulphate of alumina in solution. The sulphate of alumina is then drawn off into another leaden cistern, and the clay again lixiviated with water to extract any remaining sulphate of alumina, which, after settling about twenty-four hours, is drawn off into another cistern, and employed instead of water, and in lixiviating a fresh quantity of clay.

The sulphate of alumina thus formed is always impregnated with a considerable portion of iron, to get rid of which, Mr. Hervey employs two methods :—in the first place he adds to the sulphate of alumina a quantity of prussiate of soda or prussiate

of lime, or any other combination of the prussic or ferro-prussic acid sufficient to precipitate all the iron held in solution in the sulphate of alumina ; the supernatant solution of sulphate of alumina is then drawn off, and is ready for use. If it be required to convert this sulphate of alumina into alum, the requisite quantity of potash or ammonia salt is added to it, and alum obtained by crystallization and rocking as in the ordinary method.

Mr. Birkmyre patented, Sept. 19, 1844, a combined process for manufacturing potash and soda alums, sulphuric acid and sulphate of soda. His improvements consist, firstly, in the application of clay, particularly Cornish or porcelain clay, for the purpose of preventing the too rapid disengagement of the oxides of nitrogen from the nitrate of potash or nitrate of soda in the nitre pot, in sulphur furnaces or pyrites kilns employed in the manufacture of sulphuric acid, and the production at the same time of potash alum or soda alum, according as nitrate of potash or nitrate of soda is employed. Secondly. In decomposing substances containing potash and alumina, or soda and alumina, by the action of heat and sulphuric acid, or of heat, sulphuric acid, and a salt of potash or soda, for the purpose of forming a salt of alumina, in vessels contained within sulphur furnaces or pyrites kilns, and condensing the volatilized sulphuric acid in vitriol chambers. Thirdly, In producing sulphate of soda, by decomposing a solution of soda-alum by a salt of potash into potash-alum and sulphate of soda.

The mode of carrying out the invention is as follows :—1600 lbs. of dry Cornish clay, in powder, are to be mixed with one ton of powdered nitrate of potash ; then, for a vitriol chamber making $1\frac{1}{2}$ tons of sulphuric acid, sp. gr. 1.848, per diem, take every ten hours 18lbs. of this mixture, and put it into a nitre-pot, and after stirring in 14lbs. of sulphuric acid, sp. gr. 1.750, place the pot a few inches above the burning sulphur of a pyrites kiln. By the action of the heat and sulphuric acid, the oxides of nitrogen begin gradually to escape into the chamber, and the mixture, which becomes converted into a species of burnt alum, should be withdrawn from the kiln at the end of four hours. The product in the nitre-pot will generally weigh 22lbs., and yield, in lixiviating with ten per cent. of sulphuric acid, as much potash-alum as will be equal to two-and-a-half times the weight of the nitrate of potash employed, or fully half the quantity that can be extracted. The above process admits of variety in its application ; for instance, if $10\frac{1}{2}$lbs. of nitrate of potash were used with 15lbs. of Cornish clay, and $20\frac{1}{4}$lbs. of sulphuric acid, sp. gr. 1.750, the whole of the potash might be converted into potash alum ; but Mr. Birkmyre prefers resorting to the following operation to convert the whole of the potash into potash-alum :—Put 25lbs. of powdered Cornish clay into a large nitre-pot, and then stir in 37lbs. of sulphuric acid, sp. gr. 1.750, place the pot above the burning sulphur of a pyrites kiln, and at the end of four hours withdraw it ; or, instead of 37lbs. of sulphuric acid, sp. gr. 1.750, 60lbs. of sp. gr. 1.400 may be used. The product resulting from the weaker acid is nearly the same as that from the stronger acid, with the advantage of rendering the use of steam in the chamber unnecessary ; the greater part of the acid, in both cases, combines with the alumina and potash, or soda of the clay, forming chiefly a sesqui-sulphate of alumina. Of the substance thus prepared, 168lbs. are to be mixed with 336lbs. of the product from the nitrate of potash and clay, and the mixture lixiviated with 67lbs. of sulphuric acid, sp. gr. 1.400, in a leaden vessel placed over the flue of the reverberatory furnace used for making alkali. In six or eight hours the lixiviation will be complete, and the solution should then be run off, at 36° Twaddle into a leaden settling-cistern, placed in a hot chamber, in order to settle the silica of the clay, and prevent the crystallization of the alum. After settling, the clear liquor may be pumped into the ordinary boilers for concentration.

Soda-alum and sulphate of soda are manufactured by Mr. Birkmyre in the following manner :—One ton of nitrate of soda is to be mixed with 2000 lbs. of powdered Cornish clay ; then, for a vitriol chamber making $1\frac{1}{2}$ tons of sulphuric acid, sp. gr. 1.848 per diem, take every two hours 17lbs. of this mixture and put it into a nitre-pot, stirring therewith 20lbs. of sulphuric acid, sp. gr. 1.750 ; then place the pot above the burning sulphur of a pyrites kiln, and at the end of four hours withdraw it therefrom. 500lbs. of this product are to be lixiviated with 67lbs. of sulphuric acid, sp. gr. 1.400, in a leaden vessel, and at the expiration of six or eight hours the solution is to be conveyed into a settling-cistern, placed in the open air. The clear liquor from the settling-cistern may be concentrated for soda-alum, or it may be decomposed by 250lbs. of acid sulphate of potash into potash-alum and acid sulphate

of soda. The latter should be transferred to a reverberatory furnace, and there converted into sulphate of soda by the addition of 75lbs. of common salt for every 300 imperial gallons of the solution of acid sulphate of soda at 30° Twaddle. Instead of Cornish clay other clays, or albite or felspar may be used.

Mr. Cliff's process (June 5th, 1845) for obtaining alum from the "Wortley fire clay," is as follows :—The Wortley fire-clay, or any other fire-clay containing alumina in excess, is first ground, then calcined, and afterwards submitted to the action of sulphuric, nitric, muriatic, or other acid, more or less diluted with water, and with or without the assistance of heat. The mass being lixiviated with water, the alumina is obtained in solution, and this solution is freed from iron by the employment of prussiate of potash, gallic acid, sulphuretted hydrogen,or some other suitable agent. The solution is then either evaporated *per se* to obtain the sulphate, nitrate, or muriate of alumina, according to the acid used, or sulphate or muriate of potash, soda, or ammonia is mixed with the solution, which is then evaporated to crystallization, and commercial alum obtained by rocking in the usual way. After the whole or the greater part of the alumina has been extracted as above described, the purified residuary earth may be employed alone or combined with other clay, in the manufacture of fire-bricks, glass-house pots, crucibles, gas-retorts, and similar articles.

Manufacture of Alum from Clay and Pyrites.—Mr. W. H. Gossage's mode of obtaining alum (date of Dec.20th, 1850) by the combustion of pyrites and clay is thus effected:—If potash alum be required, burnt pyrites, containing copper, is selected, and reduced to fine powder, and with each 200 parts of this powdered pyrites, 22 parts of chloride of potassium, 80 parts of raw pyrites, containing about 35 per cent. of sulphur, and 80 parts of clay, containing about 35 per cent. of alumina are mixed, and as much water added as will serve to form a cohesive mass, which is to be divided into balls, of about half the size of a man's fist, dried and burnt in kilns of a similar construction to those employed in the manufacture of sulphuric acid from pyrites. The kiln is first heated to a suitable degree, by means of burning fuel introduced therein, on which the dried balls above mentioned, and some coke or small coal is placed, the proportions of the latter being so regulated as to afford sufficient fuel to obtain a red heat. Portions of the burnt balls are withdrawn from the kiln after six hours' exposure to heat ; and to every 100 parts of balls four parts of sulphuric acid are added. The mass is then lixiviated with hot water, and thus a solution of potash-alum is obtained, containing also iron and copper.

The latter of these is removed from the alum solution by precipitation with metallic iron in the usual way. The solution is then evaporated and set aside to crystallize, when potash alum is obtained. The mother-liquor of the first crystallization contains iron. This may be removed by concentrating and crystallizing it the second time, when the iron, in the form of protochloride, is obtained. The mother-liquor of the second crystallization is used instead of water for the lixiviation of subsequent batches of potash-alum. If soda-alum be required, common salt must be substituted for chloride of potassium in the above operations, which in other respects are to be conducted in the same manner.

To obtain sulphate of alumina Mr. Gossage employs the same mixture as that above mentioned, omitting the chloride of potassium. This mixture is made into balls and heated in the way before mentioned, by which means solution of sulphate of alumina is obtained, containing sulphate of iron and sulphate of copper. The copper is removed by means of metallic iron in the ordinary way. The iron which exists in the solution in the state of proto-sulphate is converted into a persulphate on exposure to the air. Lime is then added to the solution in sufficient quantity to precipitate the persulphate formed—care being taken not to add it in excess, and to keep the mixture heated and well stirred during the operation.

Manufacture of Alum from Felspar.—Dr. Turner's process (Oct. 8th, 1842) for making alum from felspar is as follows:—If it be desired to make a potash-alum, the best substance to operate upon is a potash felspar. This felspar is ground in a common edge-stone mill to the consistency of fine sand (a process which is much assisted by first heating it to redness, and then plunging it in cold water). It is then mixed with its own weight of sulphate of potash, and placed in the upper part of the inclined bed of a reverberatory furnace (being such a furnace as is known in the potteries as a frit-furnace), and which furnace has previously been brought to a full white heat. When by the action of the heat a glass has been produced, and is observed to flow down the inclined bed of the furnace, to such glass is to be added gradually, at the

lower end of the furnace, as much carbonate of potash as was before used of sulphate of potash; and this process of placing the mixture of felspar and sulphate of potash at the upper part of the bed of the furnace is to be repeated, adding at the lower part of the bed, gradually and proportionally, as the glass flows down from the upper part, the carbonate of potash, as before mentioned. This is continued until the sack of the furnace is filled with the glass; this glass is then fit for the next process. The preparation of the glass may also be effected in a reverberatory furnace with a flat bed; and the facility of removing the glass from such a furnace is an advantage. In this case no carbonate must be added to the mixture until the sulphate of potash is observed to be completely decomposed.

On boiling in water the glass thus obtained, the same quantity of potash as was added to the felspar and two-thirds of the silica contained in the felspar are dissolved, while the remaining one-third of the silica and the alumina and an equal quantity of potash as the felspar originally contained, are left in the form of a light porous substance, similar in chemical composition to the mineral commonly called elœolite. This porous substance is carefully separated from the said solution and washed with water until freed from the silicate of potash, then placed in an open leaden cistern or boiler and boiled with dilute sulphuric acid of the specific gravity 1.2. This acid will contain about the quantity of water required for the solution and crystallization of the alum produced by the decomposition of the elœolite. The quantity of the dilute sulphuric acid must be such as will contain about 160lbs. of dry sulphuric acid for every 285lbs. of felspar rock (if that rock be used); and in like proportion to the silica and alumina contained in the substance, if any other substance be used; as it is important that the alum solution thus obtained should not contain an excess of acid, I recommend that only four-fifths of the proposed quantity of dilute sulphuric acid should be used in the first operation, which will leave a portion of the elœolite undecomposed; but by acting upon this undecomposed portion, after the solution has been drawn off, with the full quantity of dilute acid to be used in the next operation, it will be completely decomposed, and the alum thus formed become part of the next batch. In this way a neutral solution of alum is obtained at each process. The boiling solution, after the sediment subsides, is drawn into coolers, such as are commonly used for the crystallization of alum. Here about four-fifths of the alum, held in solution, will form into crystals.

The mother-liquor from the coolers is boiled in any convenient boiler to dryness, in order to render the silica it contains insoluble; the residuum is boiled either in water or in the mother-liquor from the roaching tubs, so as to dissolve the alum it contains, and the process of crystallization repeated. Had the above process been performed with the salts of soda instead of potash, a soda-alum would have been formed. For this purpose the soda felspar, or albite, should be selected. The potash or soda (as the case may be) contained in the liquor, drawn as aforesaid from the elœolite (or nepheline, which is formed when soda is used) may be recovered by either of the following processes:—The strong solutions which are obtained, about the specific gravity of 1.2, are placed in any convenient vessel in which a stream of carbonic acid gas, obtained in any convenient method, may be driven through them; the carbonic acid becomes absorbed, and the solution assumes the form of a gelatinous mass; this mass consists of carbonate of potash or soda and hydrate of silica. On drying this mass in a furnace, which must never be allowed to rise to red heat even in the dark, the silica loses its water and becomes insoluble; the potash or soda may then be separated from it in the form of a sesquicarbonate of potash or soda, by solution and evaporation to dryness. The other process which under most circumstances will be found more economical and convenient, is to allow the boiling solution of silicate of potash or soda to filter through a bed of caustic lime, when it will be found that the lime has combined with the silicate, and a caustic potash or soda ley is obtained. This process can be conveniently conducted in an apparatus similar to that used by soap-makers for the preparation of their caustic leys. The potash or soda may then be readily obtained as caustic potash or soda, or as carbonate, by the known processes used in making soda. The weak solutions of silicate of potash or soda are used to decompose another portion of the glassy substance.

Manufacture of Alum from the residuum of the Distillation of Boghead Cannel Coal.—It has been found that some varieties of coal, more especially that kind known as Boghead cannel coal, after having been distilled and exposed to the action of steam

in retorts, furnishes an ash which contains a considerable quantity of alumina, in a state in which it is readily dissolved by acids, and which is capable of being used in the manufacture of sulphate of alumina. For this purpose, in Barlow's process (dated April 15th, 1851) the ash is introduced into a pan or boiler, with a sufficient quantity of dilute sulphuric acid, and it is heated so as to dissolve the alumina and form a solution of sulphate of alumina. The boiler which is employed for this purpose has a vertical partition perforated with holes, which divides it into two compartments. The ash of the Boghead cannel coal is placed in one compartment, and heat is applied under the alumina from it, while the undissolved silica contained in the ash remains in the compartment which is not exposed to the direct heat of the fire. The sulphate of alumina thus obtained is mixed with solution of sulphate of potash or ammonia, and the alum is crystallized in the ordinary manner.

Instead of employing the ash resulting from the treatment by steam of the residue of Boghead cannel coal, this residue may be employed in the manufacture of alum without such treatment by steam, in which case the residue is first used as fuel to heat the pans, and the ashes obtained from its combustion are placed in the pans and heated with dilute sulphuric acid in the way above mentioned.

Mr. Laming's mode (dated Aug. 12th, 1852) of obtaining alum from Boghead, or other coal of a like nature, is as follows:—The coke is burned in the open air to reduce it to a white ash, care being taken that the ignited coke never lies in heaps of more than a few inches thickness, and that its temperature never rises from any cause high enough to fuse together the alumina and the silica with which this kind of coke abounds. The white ash thus made or obtained in any other manner is lixiviated in leaden vessels, with repeated doses of hot sulphuric acid (the strength may be about 70 to 80 per cent.), until the ash is nearly exhausted of alumina. The solutions thus obtained are again heated and used for lixiviating one or more portions of fresh ash, each dose of the acid being withdrawn as it acquires its maximum quantity of alumina. The iron with which the solution of ammonia is contaminated, may be removed by the ordinary means. The solution is then to be concentrated by evaporation, or the sulphate of alumina may be made into alum in the usual way. Sometimes, instead of first reducing the coke to a white ash, the coke itself is lixiviated in the manner described.

(*To be continued.*)

UREA IN ITS RELATIONS TO THE GENERAL PHENOMENA OF ANIMAL PHYSIOLOGY.

BY TH. BISCHOFF.

There is no longer any doubt that accurate knowledge of the phenomena of animal organisms can only be acquired by the aid of a more intimate acquaintance with the unceasing chemical metamorphoses which take place in them. These changes must be understood, not only qualitatively but quantitatively, before our views on this subject can possess any scientific precision.

Towards the attainment of this object much has already been achieved, but indefinitely more remains to be done. This is particularly the case with regard to the metamorphoses of the nitrogenous constituents of the organism which are justly considered to be of such predominant importance in its actual activity. The history of the nitrogenous elements of food is at the present time incomparably more extended and minute than formerly. So likewise the study of the nitrogenous excretions, particularly urea, has been abundantly and productively cultivated. No doubt is entertained that it is derived from the nitrogenous elements of food, but with regard to the quantitative and even qualitative relations which obtain between them there is the greatest uncertainty and diversity of opinion.

While some regard urea as the ultimate product of a series of metamorphoses of the nitrogenous elements of food which can be developed only in the living organism and by the action of the organs, others entertain the opinion that the albumen of the blood is converted directly into urea, even in the blood.

According to the former view urea, independently of some other less important nitrogenous excretions, might be regarded as a quantitative measure of metamorphoses in the nitrogenous organs, a circumstance which would be of incalculable value with reference to the functions and agency of these organs. Such a proceeding is, however, inconsistent with the latter view, which represents the quantity of urea as dependent upon the accidental quantity of albumen in the blood.

An unprejudiced consideration of the researches which have hitherto been insti-

tuted for the purpose of deciding these questions, will at once show that they are altogether unsatisfactory. For on the one hand the chemical methods adopted for the quantitative estimation of urea were either liable to inaccuracy, or involved troublesome and tedious operations, which were applicable only in a few particular instances. On the other hand, it was certain that the constitution of urine and the quantitative relation of its several constituents are variably influenced by so many circumstances, that a correct insight into its qualitative importance and quantitative excretion could only be attained from a very great number of observations, and when the conditions under which they were made were exceedingly varied, and at the same time well known and definite.

If, therefore, the relation of urea to the general functions of life are to be more exactly investigated, and if the quantity in which it is excreted is to be recognized as the measure of metamorphosis of nitrogenous constituents of the organism, a method must be found for its quantitative estimation which will be at once certain, facile, and rapid in its execution.

Such a method has been contrived by Professor Liebig, which, with a little practice, admits of an estimation of urea being made in a quarter of an hour. I have in this manner instituted a large number of experiments with human urine and that of dogs and rabbits. The quantity of urea that the dog formed under the most diverse conditions of feeding was daily estimated during a whole year. The same was done for a period of five months with a rabbit.

For the human organism I have only endeavoured to ascertain the quantitative relations of urea under the normal circumstances of life during long periods and for individuals of different sex and age. The results which have thus been obtained present very considerable discrepancies with the statements previously made.

In the case of the animals mentioned, however, I have more especially convinced myself that the determining conditions for the formation and excretion of urea are far more variable and multiform than has hitherto been supposed, and that they are influenced by circumstances so numerous and changeable that there is still a necessity for a much larger accumulation of accurate observations before the laws of this excretion and its correlative phenomena can be definitely evolved.

Although at present we can only consider the first step as having been taken, I believe that I have obtained some results which, while they remove previous doubt and present the subject under new aspects, may perhaps serve as the basis of further research.

Among these results are the following :—

1. Urea is unquestionably under all circumstances the measure of the metamorphosis of nitrogenous constituents of the organism. It never originates from a direct metamorphosis of the albumen of the blood and vascular system. It is formed in the blood only from gelatin, and this perhaps never enters the blood unaltered in the normal conditions of life. The urea in this case is not a product of the metamorphosis of solid portions of the organism.

2. But although urea always originates in this manner from the metamorphosis in the organs, still, the quantity and quality of the food exercise a far greater influence upon the production of urea and the general metamorphosis than could hitherto have been supposed. It is indeed true that urea is formed and excreted under a total deprivation of food ; but the percentage of nitrogen in the food exercises so great an influence upon the quantity, that when, for example, the dog on which I made my observations consumed in twenty-four hours 4000 grms. of cow flesh without fat or bone, he excreted in the same time 190 grms. of urea, while with 500 grms. of potato and 250 grms. of fat the quantity excreted was only 6 or 8 grms.

Food destitute of nitrogen, such as fat, under all circumstances produces a limitation of the metamorphosis of the nitrogenous portions of the organism. At the same time there is in most instances, *cæteris paribus*, a diminution in the quantity of urea excreted, but not always. When the food consists solely of fat both consequences obtain ; the excretion of urea as well as the metamorphosis is diminished. The same is the case with a very full flesh diet. With a flesh diet merely sufficient for maintaining the weight of the body fat limits the metamorphosis, but the quantity of urea excreted is not necessarily diminished at the same time ; it may indeed become greater than that excreted when the same quantity of flesh is consumed without fat, in accordance with a law stated subsequently.

3. It has moreover been found, that the quantity of nitrogen in the food or portions of the organism metamorphosed within a certain period never appears entirely

as urea, but that a certain, and under some circumstances considerable part, must be excreted in another form. This is likewise true in the case of dogs, although their urine does not contain uric acid, and scarcely a trace of other nitrogenous organic substances. Only very small quantities of nitrogen are excreted in the fæces, and as this is also true with regard to the lungs and skin, according to admirable researches of Regnault and Reiset, it is difficult to form a correct opinion as to the form in which that part of the nitrogen of metamorphosed portions of the organism that is not found in the urine is excreted. It is most probable that this deficiency is owing to a partial conversion of urea in the blood, or perhaps even in the bladder, into carbonate of ammonia, which is excreted either by the skin and lungs or in the urine. However worthy of confidence the observations of Regnault and Reiset may be, I am still of opinion, that it has not hitherto been possible to continue them for a sufficiently long period, and under the necessary alterations of diet for determining with absolute certainty, whether or not carbonate of ammonia is excreted by the skin and lungs. The presence of carbonate of ammonia in the urine would be very probable, at least when, even with an exclusively flesh diet, or under a deprivation of food, it was alkaline while quite fresh and effervesced on the addition of an acid.

The quantity of nitrogen of the metamorphosed portions of the organism, which does not make its appearance as urea, is upon the whole tolerably constant under very diverse circumstances of diet and metamorphosis. It was found greatest, both relatively and absolutely, under a deficient supply of nitrogenous food (250 grms. of flesh). It might in this case amount to more than $\frac{2}{3}$rds of the total nitrogen of the metamorphosed tissues. With a supply of nitrogenous food adequate for maintaining the weight of the body (500 grms. of flesh) it amounted to $\frac{1}{3}$rd. Under a very full and excessive flesh diet it was smaller absolutely than in the above cases, and was consequently so much reduced, relatively, as to be almost insignificant. I regard these facts as the strongest evidence that the original product of metamorphosis of nitrogenous tissues is solely urea, of which a certain portion experiences a further change—into carbonate of ammonia—proportionately greater when the quantity of urea is large than when it is small. The presence of fat in the food appears under certain circumstances to prevent or limit this further alteration of urea. It is owing to this influence, that although fat, as already remarked, limits the metamorphosis, and consequently the formation of urea upon the whole, still under a diet consisting of flesh and fat, the quantity of urea excreted may become greater than when the same quantity of flesh is taken without fat, because the nitrogen of the metamorphosed tissues remains in the form of urea. I am of opinion that fat exerts this influence by virtue of its connexion with the process of respiration. Lastly, water exercises an influence upon the deficiency of nitrogen appearing as urea. Thus, for instance:—

4. The quantities of water and urea always bear a very constant relation to each other. No other constituent of the urine has so decided an influence upon its density as urea. Dense urine always contains much urea; specifically light urine is always poor in urea. Nevertheless, the quantity of urea excreted upon the whole within a given period, is related in the most intimate manner with the quantity of water, and *cæteris paribus* a large quantity of urine carries off more urea than a small quantity passed in the same time, although its specific gravity may fall considerably at the same time.

This influence of water may be owing to several circumstances—an increased facility in the solution and extraction of urea; perhaps also to an increased facility in the formation of urea. But it is moreover quite certain that water has an influence upon the quantity of urea in so far as the time and rapidity with which the urine is evacuated depend upon its greater or less quantity. In the presence of much water the urea formed is very rapidly separated from the blood and from the organism. There is not much time then for any further alteration of the urea, and consequently its quantity is greater while the quantity of nitrogen not in the form of urea becomes less. Hence it is more particularly explicable why with different quantities of nitrogenous food (flesh); with little there is a comparatively and even absolutely great deficiency of nitrogen in the state of urea, and with much flesh, on the contrary, little deficit. For in the former case the quantity of urine passed is very small, often only a few cubic centimeters during several days; in the latter, on the contrary, very great, amounting to 1200 or 1500 cubic centimeters in twenty-four hours.

It follows from these facts, perhaps with certainty, that the quantity of urea

excreted under certain circumstances and within a certain time, cannot be taken as the direct measure of metamorphosis in the tissues, even when the urine does not contain any other nitrogenous constituent. Still it will always be the most important element for ascertaining its amount, and it will only be necessary to study more closely the influences exerted upon its formation and excretion, towards the elimination of which I hope to have furnished some contribution.—*Annalen der Chemie und Pharmacie, October*, 1853.

METHOD OF TESTING LITHARGE FOR COPPER AND IRON, AND OF PURIFYING IT FROM THEM.

According to Lucanus,* the best test for copper and iron in litharge, or red lead, is to heat it with dilute sulphuric acid, and treat the filtrate with a solution of ferrocyanide of potassium, which gives a blue precipitate with iron, and a brown one with copper. He likewise finds that digesting in dilute sulphuric acid is the best means of separating these metals from litharge or red lead. Only a very minute quantity of sulphate of lead is formed, and that may be so far separated while suspended in the liquid, that litharge thus purified is better adapted for making lead plaster, or acetate of lead, than such as contains copper or iron.

OCCURRENCE OF NICKEL AND COBALT IN SOME MINERAL SPRING WATERS.

Some time since Mazada, a Pharmacist at Valence (Depart. de la Drôme), stated that he had found, in the ferruginous waters of Nayrac and their ochreous deposits, titanium, zirkonium, cobalt, and nickel. In consequence of this statement O. Henry† has examined several ferruginous waters for cobalt and nickel, and has found both metals by means of the following method:—

A large quantity of the water is mixed with slight excess of carbonate of soda, and left exposed to the air until the iron is completely converted into peroxide, and deposited. This deposit, or the ochreous deposit of the springs, is dissolved in hydrochloric acid, the zirkona, titanium, silica, and sand, separated by evaporation to dryness, the filtered aqueous solution, containing alumina, lime, magnesia, iron, manganese, nickel, and cobalt, again treated with carbonate of soda, until a precipitate is formed, which is exposed for a long time to the air, in contact with a large quantity of water, and frequently agitated. It is then washed and digested with an aqueous solution of carbonic acid, which dissolves for the most part only the carbonates of nickel and cobalt. Sulphuretted hydrogen or sulphuret of sodium is then added, and the cobalt and nickel are precipitated, generally very slowly; the sulphurets are dissolved in nitro-hydrochloric acid, and the usual tests for these metals applied.

MEANS OF PREVENTING THE SPONTANEOUS DECOMPOSITION OF URINE.

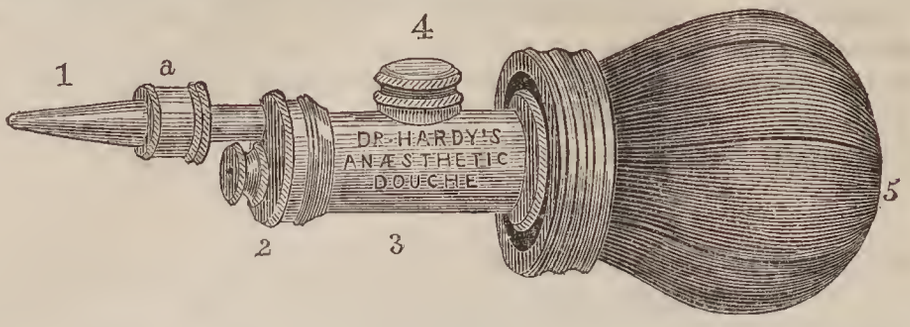
Bayard‡ states, that when coal-tar naphtha is added to urine in the proportion of six drops for each pound, or a larger quantity of coal-tar, the urine may be evaporated to dryness in the sun without decomposing.

APPARATUS FOR CHLOROFORM VAPOUR.

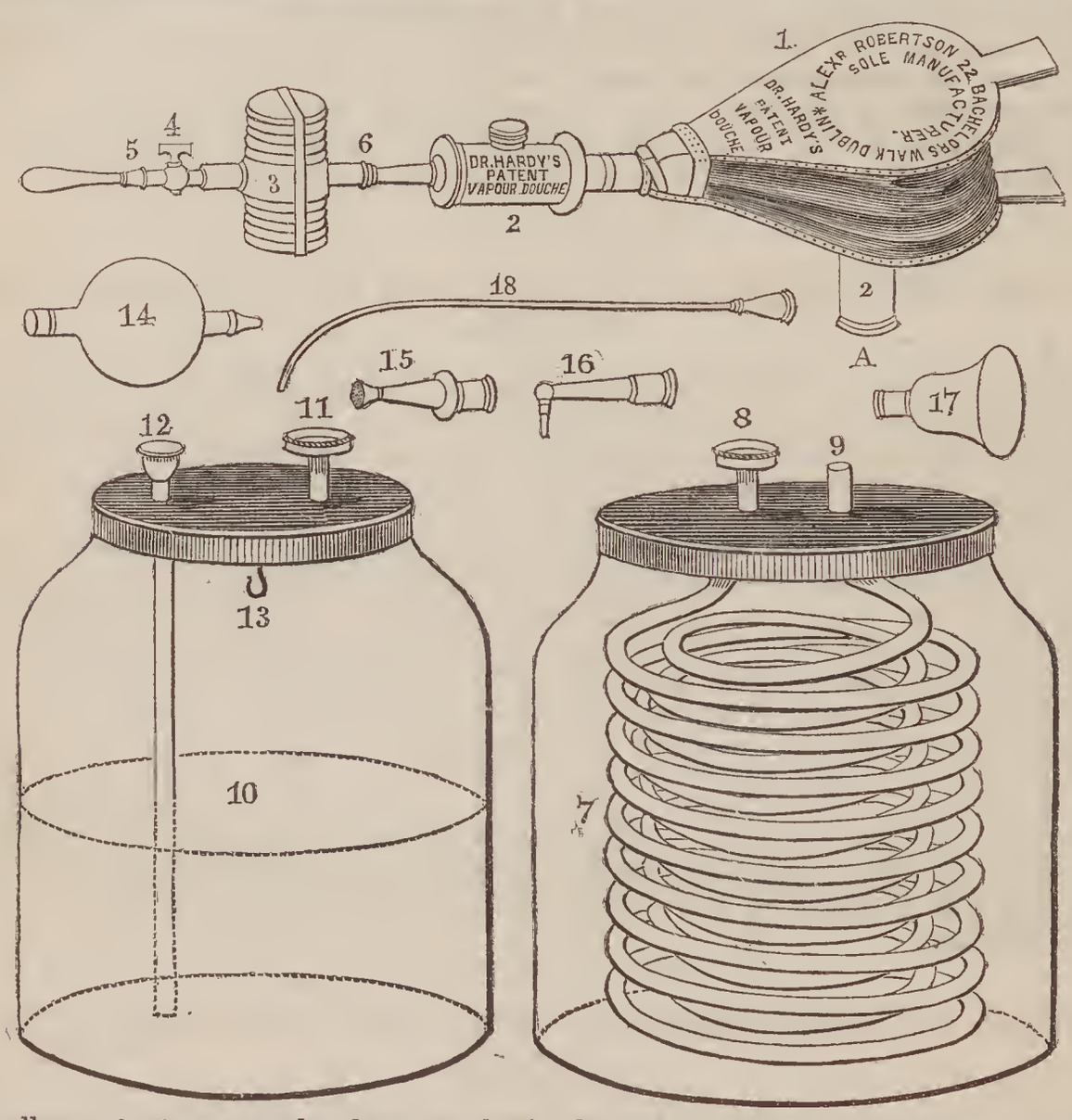
The Dublin Medical Press, of April 19th, contains a paper by Dr. Hardy, on the application of the vapour of chloroform by the *douche*, which has been attended with considerable success. The following is a description of the apparatus used. The

* *Archiv der Pharmacie, October*, 1853.
† *Journal de Pharmacie et de Chimie*, 3 Sér., xxiv., 305.
‡ Notizen aus dem Gebiete der practischen Pharmacie.

second drawing represents the instrument used when the vapour is required to be applied with greater force and in a continuous stream.



1, small pipe containing a valve *(a)* for transmitting the vapour; 2, air-valve; 3, chamber containing within it a sponge for holding the chloroform; 4, screw stopper for closing sponge-chamber; 5, India-rubber bottle attached.



1, bellows; 2: 2, sponge-chambers; 3, elastic chamber; 4, stop-cock; 5 and 6, connecting screws; 7, jar; 8, connecting screw of spiral tube for attaching it to sponge-chamber at A; 9, end of spiral tube: 10, jar; 11, tube to connect to chamber 2 at A: 12, air-tube; 13, hook for thermometer; 14, glass or platinum chamber; 15, 16, 17, various conveyance pipes for attaching to screws 5 or 6: 18, catheter.

CONSTITUTION OF THE LINARIA CYMBALARIA.

BY M. WALZ.

The distillate of the plant contains a fat, which the author separated from the watery portions by means of æther. After the spontaneous evaporation of the æther there remained a fatty mass of scale-like crystals, which, when heated and rubbed between the fingers, emitted a peculiar odour. The acid watery distillate was neutralized with caustic baryta, and evaporated to dryness in the vapour-bath.

The saline mass obtained was of a brown colour, and only partially soluble in water, leaving a brown tasteless mass. The soluble portion was decolourized as far as possible by pure charcoal, and evaporated to a crystallizable state. This mass contained acetic acid in combination with another acid. The remaining vegetable mass was then repeatedly extracted with water; half the extract, which was rather bitter, and had an acid reaction, was rapidly evaporated on the water-bath to the consistence of an extract, and then treated with alcohol of sp. gr. 0.833; to the other half neutral acetate of lead was added as long as any precipitate was formed. When this had been well washed, half of it was decomposed by sulphuretted hydrogen and the other half by sulphuric acid. The filtrate from the latter operation had a dark brown turbidity, and could only be slowly filtered from the adhesive resin being suspended in the fluid.

In the clear filtrate there existed, in addition to some resin, a brown colouring matter, which is readily soluble in water; a tannin, striking a green colour with salts of iron; the inorganic acids; and, lastly, tartaric and malic acids. The same constituents were found in that portion of the lead precipitate which was decomposed by sulphuretted hydrogen. In the fluid filtered from the lead precipitate, only a small precipitate was furnished by basic acetate of lead. After filtration from this precipitate, the solution only contains a bitter principle, to which the author gives the name of Cymbalarine. This was precipitated by means of tannic acid from the fluid after it had been freed from lead by carbonate of soda; the precipitate was digested in alcohol, which acquired a deep golden-yellow colour; the digestion was repeated as long as the alcohol dissolved anything, and then the whole of the extracts were digested with pure oxide of lead until all the tannic acid was combined with the oxide. The greater part of the alcohol was then carefully distilled off, and the remainder got rid of by spontaneous evaporation; in this manner a yellowish-brown scaly residue, which changed readily into an amorphous resinous mass, was obtained; it had a very bitter disagreeable taste, and was only partially soluble in water. The entire residue was digested with æther, which soon acquired a yellow colour, and left on evaporation a dark golden-yellow resinous mass, of a very sharp taste. This is soluble in absolute alcohol, and must be regarded as the cause of the pungency of the plant. The portion which was soluble in æther is the bitter principle of the plant, not, however, quite in a pure state; when exposed to the air it becomes moist, and when burnt leaves a little alkaline ash. For this reason it was again dissolved in water, and precipitated by pure tannin; the entire white precipitate soon collected into a resinous mass, this was washed as much as possible with water, then carefully dried, reduced to fine powder, mixed with alcohol and pure oxide of lead, and put in a warm place. After the tannin had combined with the oxide of lead, the tincture was filtered, the alcohol partially distilled off, and the remainder left to evaporate spontaneously. White scales were soon formed on the surface; which continued increasing, and in time gathered together into a mass, and dried into a yellowish-white powder. In this state it is the cymbalarine of he author.

IMPROVEMENTS IN PURIFYING TIN.

(John Arthur Phillips's Patent, enrolled May 6.)

These improvements consist in causing tin to be melted and run into water to obtain it in a finely granulated state, and in this condition it is dissolved by muriatic acid, which is drawn off, to separate any precipitated or deposited matter, such as tungsten, and into this solution more granulated tin is introduced, which throws down antimony or arsenic, should any be present The liquor is again drawn off into another vessel, and the tin is precipitated by means of zinc. The precipitated tin, after being washed, is compressed into masses, and afterwards fused. The solution of chloride of zinc is precipitated by means of chalk or lime. Should any copper be present in the first solution, it may be precipitated by means of them.

TRANSPARENT CEMENT.

According to Lenher* this may be prepared by dissolving 75 parts of caoutchouc in 60 parts of chloroform, and adding to the solution 15 parts of mastic.

* Belgique Industrielle.

BROMO-CARBURETTED HYDROGEN IN THE MOTHER-LIQUOR OF THE SCHÖNEBECK SALINE.

BY MORITZ HERMANN.

The author has made known in an inaugural dissertation,* the results of an extended examination of an oily substance, the occurrence of which has already been made known. It is obtained towards the end of the distillation, by which the bromine is extracted from the mother-liquor of the saline. When pure it is a colourless, limpid liquid, with a sweet ethereal odour, burning taste, and a specific gravity of 2.548, at 37°.4 F. It boils at 244°.4 F. On analysis he found it contained in 100 parts

C.....	6.5942
H.....	0.5838
Br.....	92.8220

Its formation is, in all probability, connected with the decomposition of organic substances contained in the mother-liquors.—*Journal für Praktische Chemie, November*, 1853.

CARBONATE OF IRON AS A MEANS OF STOPPING HEMORRHAGE.

Lastelle† recommends the use of this substance for stopping the hemorrhage from the bite of leeches, and states that it is very effective.

MEANS OF REMOVING THE RANCID ODOUR OF FATS.

Dr. Griseler ‡ has accidently made the observation, that an addition of nitric ether to rancid oil entirely destroys the disagreeable smell; and that when the oil is heated to separate the alcohol it becomes clear and bright, even when it was before turbid. According to Dr. Griseler, a few drops of this liquid prevent oils from becoming rancid.

Westminster Hall, May 9th, 1854.

IN THE QUEEN'S BENCH.

THE QUEEN *v.* THE PHARMACEUTICAL SOCIETY.

MOTION.

Mr. Horace Lloyd.—In a case of the Queen against The Pharmaceutical Society, I am instructed to move for a Rule to show cause why the Trial of the Action which has been brought, should not take place in its regular order. A mandamus was moved for against the Society, and upon the return an action was brought, and it has been made a Special Jury Cause, and I hope to satisfy your Lordships that there is a good reason for this application, as there can be no object, except delaying the trial of the cause, in setting it down as a special jury cause. I cannot put it before your Lordships more clearly than in pointing out the principal part of the affidavit which is made by one of the attornies for the plaintiff.

Mr. Justice Wightman.—You purpose that the case should stand in its order and be tried by a common jury, unless a special jury be struck in time? You move to discharge the rule for a special jury.

Mr. Lloyd.—No. I believe it must now be considered that that cannot be done.

Lord Campbell.—What is your motion?

Mr. Lloyd.—That the case should be tried by a special jury, but in the order in which it is entered.

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* *De brometo-hydrogenii et carbonici quod ex Aquis Salinæ Schönebeck una cum bromo distillatione extricatur.*

† *Repertoire de Pharmacie.* ‡ *Archiv der Pharmacie.*

Lord Campbell.—You move for a rule to show cause.

Mr. Lloyd.—Yes, my Lord.

Lord Campbell.—Very well, that is the regular course; you are quite right.

Mr. Lloyd.—The action is brought on the return to a mandamus—a mandamus commanding the Registrar of the Pharmaceutical Society to prepare a Register as directed by the Act of Parliament; the return to it is this—

Lord Campbell.—You move that the cause may be tried in its order, although a special jury cause, and tried by a special jury, if the party who has got a rule for a special jury, strikes the special jury.

Mr. Lloyd.—Yes.

Lord Campbell.—Now will you shortly state the ground on which *you say this has been done for delay.*

Mr. Lloyd.—*That is simply this:* the facts are *very simple, and we say the object of obtaining a special jury must be for delay.* The mere facts to be proved at the trial are, that certain persons, whose names are on the Register, were placed upon it without having the qualification directed by the Act of Parliament, and therefore we have only to prove that those parties were not duly examined.

Lord Campbell.—What is the action for?

Mr. Lloyd.—It is a mandamus commanding the Registrar to make a Register as required by the Act of Parliament.

Lord Campbell.—Is this the case Sir Fitzroy Kelly moved?

Mr. Lloyd.—Yes, my Lord.

Lord Campbell.—*Oh dear! that is a very serious case indeed, and of very great magnitude, and there is no ground for taking it out of its order. We know enough of the case* to know that it is a very fit case to be taken as a special jury among other special juries.

Mr. Lloyd.—I only wished your Lordships to understand this—that the facts are very simple.

Lord Campbell.—*It is a case of great magnitude, and of very considerable difficulty in point of Law, and there is no ground for saying it is vexatious to apply for a special jury* in such a case. You cannot take anything by your motion.

Rule refused.

BOOKS RECEIVED.

MEDICINES, THEIR USES AND MODE OF ADMINISTRATION; *including a complete Conspectus of the Three British Pharmacopœias, an Account of all the New Remedies, and an Appendix of Formulæ.* By J. MOORE NELIGAN, M.D., Edin., M.R.I.A., &c., &c. Fourth Edition. Dublin: Fannin and Co.; Edinburgh: Maclachlan, Stewart, and Co.; London: Longman and Co. 1854. 8vo, pp. 604.

THE NEW YORK JOURNAL OF MEDICINE AND THE COLLATERAL SCIENCES. Edited by SAMUEL S. PURPLE, M.D., and STEPHEN SMITH, M.D. New Series, Vol. 12, Nos. 1, 2, and 3.

MEDICAL REFORM. *A Letter to Lord Palmerston.* By FRANCIS CLARKE. London: H. K. Lewis, 15, Gower Street North. 1854.

ADVICE TO INVENTORS REGARDING PATENTS, CAPITAL, AND COMMERCIAL CONTRACTS. By HENRY DIRCKS, C.E., &c. London: 32, Moorgate Street.

TO CORRESPONDENTS.

WE are requested by the Secretary to state, that during the time the Voting Papers were coming up from the country, the accumulation of letters was so great, that it was impossible to reply to all by return of post. On some days the number amounted to 150 or 200, 30 or 40 containing enquiries which required special answers. Several Members having complained of the delay, this explanation was necessary.

We may add, with regard to letters addressed to the Editor, that delay sometimes occurs from the fact that the questions cannot be answered without some inquiry. In a few instances the answers have been returned, the parties not being known at the address given,

We are obliged to omit several papers, among which are papers from Dr. Hamilton and Mr. W. Symons; one on certain Abuses in the Drug Trade, by a Member; another on Local Organisation, and one on Troy and Avoirdupois Weight, which are reserved for next month. We are also obliged to defer the abstract of a Report on the Geology of Sierra Nevada, by Prof. Trask, forwarded to us by Mr. Napier, A.P.S., of California.

A Pharmaceutical Student (Manchester).—(1). The yellow bark Cinchona Calisaya yields the most quinine.—(2). Mohr and Redwood's *Practical Pharmacy* might be of service, but the kind of information referred to can only be acquired by very industrious researches, or by a course of study at a practical school.

An Associate was applied to by a man who brought a ℥vj. bottle containing about ℥ss. of colourless liquid, and desired to know what it was. He tasted it hastily, and found it to be prussic acid. In such cases it would be more prudent to smell it first.

M.P.S. (Shrewsbury).—*Ferri Acetas:* ℞ Sesquioxide of iron, 1 part; acetic acid, 6 parts; digest for three days, and filter.—Ph. D.

An Associate. (Newbury).—*Ferri Citras* and *Ferri Ammonio-Citras.* See vol. i., pages 595 and 653.

M. P. S. (Tredegar)—(1.) According to the Pharmacopœia.—(2.) Cyanide of Potassium.

Malachite.—Green Oil: Bay-leaves, rue, origanum, sea wormwood, of each ℥iij, olive oil Oij; digest till the herbs are crisp, press and strain.—*Beasley.* Oleum Sambuci is sometimess called Oleum Viride.

A Member. (Manchester).—*Verbena.*

Ich Dien. (Peterborough).—*Syrupus Ferri et Quinæ.* We know of no formula; probably Syrupus Ferri et Quinæ Citratis is intended, which may be made in the proportion of 1 oz. of citrate of quinine and iron to 1 pint of syrup of orange-peel.

Delta. (Brighton).—Syrup of Violets, if genuine, is reddened by an acid, and made green by an alkali.

A Registered Apprentice.—(1.) See vol. vii., p. 298.—(2.) The third Tuesday in the month.

M. P. S. (Plymouth).—*Bye-laws.* See vol. xii. of this Journal. Apply to the Secretary.

A Correspondent. (Birmingham).—(1.) *Reduction of Chloride of Silver.* Probably the experiment would be more successful if metallic zinc or iron were used. See page 296 of the present volume. (2.) If the pill mass be made soft, all that is requisite is trituration in a mortar.

Argus. (York)—encloses a hand-bill, not at all creditable to the party issuing it, who is and styles himself a Pharmaceutical Chemist. Argus thinks some imposition has been practised on the Council. He should write to the Council, giving his name and address.

T. I. I. (Newport, Monmouth).—Stopping for teeth is sometimes made of 2 parts of quicksilver and 1 part of fine zinc filings; or 73 parts of silver, 21 of tin, and 6 of zinc, amalgamated with quicksilver; several secret compounds are used for the purpose.

O. P. Q. (Barnsley).—Lindley's School Botany. Published by Bradbury and Evans, Whitefriars.

J. W. K.—(1.) Gases cannot be kept in bladders. They may be kept in glass receivers.—(2.) We presume *bisulphate* is a misprint; it should have been *bicarbonate.*

A Subscriber. (Callington).—The liquid sold as *Essence of Rennet* is frequently solution of tartaric acid flavoured with a little rennet.

Erratum.—Page 615, line 23 from top, *for* The gramme in practice may be considered "half-a-drachm," *read* "a quarter-of-a-drachm."

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, Secretary, 17, Bloomsbury Square, before the 20th of the month.

Advertisements (not later than the 23rd of the month) to Mr. Churchill, Princes Street, Soho. Other communications to the Editor, 15, Langham Place.

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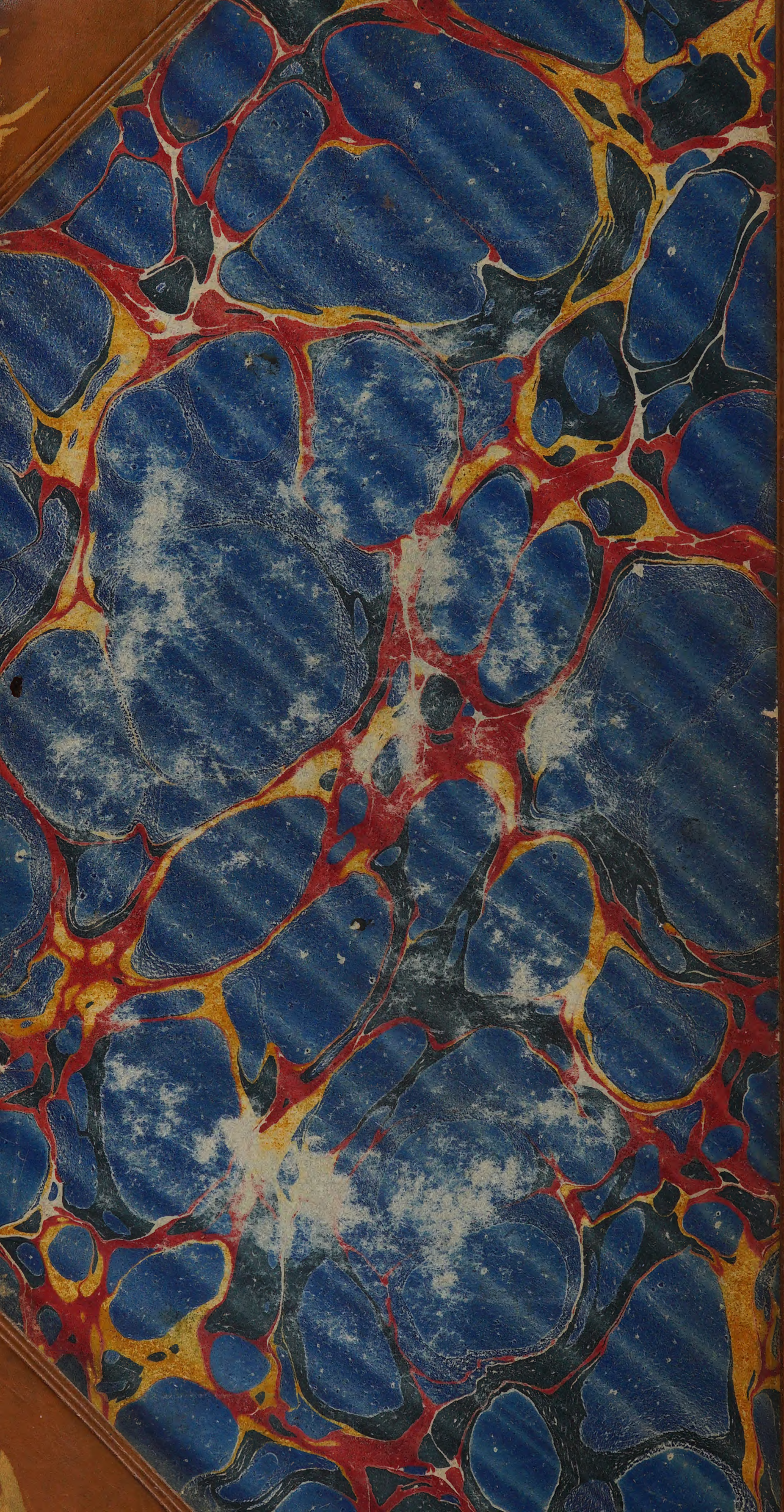
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